

Adrenalin Chloride, as an Adjunct to Cocaine in Local Anesthesia.

By CLYDE DAVIS, B.S., M.D., D.D.S., Lincoln, Neb.

Without question cocaine is the most powerful agent in use to paralyze nerve function. However, its general use has been somewhat restricted, owing to its harmful effects upon cardiac and respiratory action, in the pure and fresh solution and especially in stale solution, owing to the rapid chemical change which takes place within a few minutes when combined with water.

The local effects of pure and fresh cocaine solutions are never alarming, but it is the general effect sometimes manifest, which causes us to halt.

To limit the action of the drug to the location desired, to preserve the drug from dangerous chemical decomposition and to neutralize its toxic effects, innumerable compounds have been prepared.

I believe it is also essential to have a perfect solvent for the salts of cocaine, for if injected into the circulation in an imperfectly dissolved state, the drug is liable to pass to the cardiac muscles, or the nerve centers controlling the heart and respiratory action where its effects would certainly be productive of alarming symptoms.

It would, therefore, stand to reason that, that with which we combine our cocaine should possess the following properties:

First, It must be a perfect solvent.





Second, It should check the circulation for the time being in the parts injected, that the drug may not be rapidly carried away.

Third, The combination should contain that which has the opposite physiological action.

Fourth, The mixture should not create new chemical compounds, the properties of which are problematic, and

Fifth, The physiological effects of the antidote used should be more prompt in action than the cocaine, that it may act as a preventive rather than a cure for harmful results.

I have made some fifteen thousand injections of cocaine in various combinations and have found one drug which seems to meet more of the requirements above mentioned than any other.

This is the extract of the suprarenal gland as found in the stable solution adrenalin chloride.

With all other solutions as soon as I increased the quantity of cocaine the physiological effects of that drug increased in a similar, although not exact ratio.

But where adrenalin was used as a solvent the physiological effects of cocaine have not appeared, and I have used it in hundreds of cases varying in doses of from 1-6 grain to 1½ grains, and by its use have been able to do pretty heavy oral surgery work, usually done under a general anesthetic, and patients have felt little or no pain.

My experience with this solution has led me to make some experiments with guinea pigs, which may be of interest.

The first experiments were conducted before the dental students of the University of Nebraska, assisted by a co-laborer, Dr. M. O. Fraser, and were as much for our own instruction as the students.

I give them to you for what they are worth.

In the first experiments the comparative size of the pig and a person weighing 140 lbs. were considered. 140 lbs. = 2,240 ozs.

For the physiological effects of adrenalin chlo-

Experiment 1. ride. Pig weighed 24 oz. An equivalent to 15 drops of adrenalin chloride to the adult of 140 lbs. was injected.

At the end of two minutes a second and equal dose was given.

After a period of four minutes an increased cardiac stimulation was observed.

The heart beats were increased and strength of systole was a distinguishing feature.

At this time the equivalent to 30 minims in the adult was injected making in all the equivalent of 60 drops of adrenalin in the adult of 140 pounds.

EXCLUSIVE CONTRIBUTIONS

At the end of ten minutes from the last injection, there appeared a period of excitability, followed by a sluggishness and indisposition to move which at the end of 30 minutes had entirely worn away.

From this single case it would seem that 60 minimis injected into the healthy adult need not be followed by death, yet dangerous symptoms appeared.

For the physiological effects of cocaine alone.

Experiment 2. Weight of pig 18 oz., or about the 124th part of 140 lb. adult. The equivalent to 1 gr. of cocaine in the adult was injected. Symptoms at the end of five minutes not marked. At this time the equivalent to one more grain was injected. In two minutes time or seven from the first injection, the pig became sluggish, movements slight and uncertain.

At the end of another five minutes a marked depression in the number and force of the heart beats were noticed.

In ten minutes more, pig became seemingly normal and so remained.

In the third and fourth experiments the weight of pig as compared with adult human was not considered as to dose and only for subsequent consideration.

For the extreme physiological effect of cocaine alone.

Experiment 3. Weight of pig 22 oz. One-third of a grain of cocaine was injected which would be equal to about 34 grains injected into human adult weighing 140 lbs.

At the end of five minutes slight stupor and unsteadiness were observed.

In thirty seconds more, pig was seized with tonic and clonic spasms and at this time six minimis of adrenalin were injected without effect. Respiration ceased in three minutes and heart's action ceased in five minutes, or two minutes later.

For the extreme physiological effect of adrenalin chloride and cocaine combined.

Experiment 4. Weight of pig 24 oz. One-third of a grain of cocaine and four minimis of adrenalin in H₂O solution were injected which would equal the injection into a 140 lb. adult of 31 grains of cocaine and 372 drops of adrenalin either of which alone would prove fatal.

At the end of five minutes there were no symptoms of the drugs observed.

Ten minutes more and no symptoms, when the above large dose was repeated.

After the lapse of another ten minutes or a total of 25 minutes from first injection there were no symptoms, except increased heart's action with slowed respiration.





At this time the remainder of the contents of the syringe was injected which was in all 1 gr. cocaine with 12 m. of adrenalin chloride which you will admit was an overwhelming dose of either as the pig was less than 1-93 part the weight of 140 lbs.

Within thirty seconds the pig began to show symptoms of poisoning, and died much as did No. 3, except there was an absence of rigidity.

After reading the foregoing before the Alumni Dental Association of the State University of Iowa on February 2, 1904, the following experiments, Nos. 5, 6 and 7, were conducted, with the results as given below.

(Stenographer's report of Clinic.)

"We will now proceed with similar experiments before you, and Dr. Fraser will record the results, which may be the same or entirely different, as it must be borne in mind that idiosyncrasies as to the susceptibility to drugs exist in the guinea pig, as well as man, and only by a large number of these results can we arrive at a conclusion approximately correct. Date, February 2, 10.00 a. m."

Experiment 5. This was similar to No. 1 and was for the physiological effect of adrenalin.

Weight of pig, 22½ oz.

Syringe loaded with 12 minims of adrenalin chloride and 12 minims of H. O.

Four grains of this adulteration was injected every two minutes till entire amount was injected. Excitability appeared after second injection. Depression after third, and after the entire quantity, slight nausea and chills. The chills lasted for some hours, growing less and less, till they entirely disappeared, when nourishment was taken voluntarily.

Two pigs were injected simultaneously, the one,

Experiments 6 and 7. No. 6, with the one-sixth grain tablet of cocaine, the other, No. 7, with the same, to which was added the same as was given No. 5, the intervals being five minutes. The pig getting the one-sixth grain of cocaine, No. 6, in aqueous solution, weighed 16½ oz.; the one receiving the one-sixth grain cocaine and 2 grains of adrenalin chloride No. 7, weighed 19½ oz.

Neither showed any symptoms at the end of five minutes. At the end of ten minutes, No. 6 showed slight increased heart action, and labored respiration. No. 7 slightly increased heart action, but not so marked as No. 6, and appeared more lively.

At the end of five minutes more, the injection repeated. No. 6 showed a sluggish and dazed condition, with a tendency to rigidity.

No. 7 was not so lively, but was yet active, and seemed to be interested in what was going on about it.



EXCLUSIVE CONTRIBUTIONS

The doses were continued to each at intervals of five minutes, till each had received five injections.

Following the last injections, the condition of No. 6 grew rapidly worse as to symptoms already mentioned and was seized with convulsions in a few seconds' time, dying in the same, thirty minutes later.

No. 7 seemed to regain a normal condition following the last injection, with the exceptions of a slight and occasional twitching of the head.

No alarming symptoms appeared till the lapse of four hours, when the hind parts of pig seemed to be semi-paralyzed.

An hour later, pig was suddenly seized with a twitching of the entire body, with an entire absence of rigidity. These continued for three hours, when pig died, heart and respiration seeming to cease about the same time.

After reading the above before the Tri-city Dental Society, of Omaha, Nebraska, on the evening of February 3, 1904, experiments Nos. 8, 9, and 10 were conducted, with the results as given below, the observations being recorded by Dr. J. H. Wallace, of Omaha.

Experiment 8. For physiological effect of adrenalin chloride alone.

Weight of pig, 18 oz. Four minims of adrenalin were injected, which would be about equivalent to 490 minims in the adult of 140 lbs. In nine minutes symptoms of nausea, strength of heart action increased, also frequency of respiration.

In fifteen minutes symptoms as above, a little more pronounced.

Forty-five minutes. Very much nauseated.

One hour. Symptoms had disappeared, and attempts to nibble paper were noticed.

Cocaine alone for its physiological effect.

Experiment 9. Weight of pig 20 oz. Four-sixths of a grain, divided into three doses, were injected at intervals of five minutes.

Three minutes from first injection the pig appeared sluggish, and some intermittency noticed in heart's action.

In ten minutes, pig became very nervous and excited, spasmodic action of muscles setting in four minutes later, or seventeen minutes from first injection.

Nine minutes later extreme spasms came on, with head drawn back, muscular rigidity and very rapid respiration, which was labored. This condition gradually passed off in half hour, and at the end of an hour from the time spasms came on, pig was eating.

The combined doses of Nos. 8 and 9, i. e., four-

Experiment 10. sixth grains of cocaine and four minims of adrenalin chloride, divided into three doses, injected five minutes apart.





In five minutes, no change.

In ten minutes, no change.

In fourteen minutes, nausea.

In thirty minutes, nausea remained and pig was sluggish.

In an hour this disappeared and pig seemed normal.

The writer would like to add to this that this pig so remained till four hours later, when it suddenly died, as with heart failure.

First—From these few experiments it would

Deductions. seem that over-doses of adrenalin chloride are sure to produce physiological effects, but that these are not of

a fatal nature.

Second—That cocaine alone is deadly, and not always in proportion to the dose.

Third—That the physiological effects of adrenalin chloride are more prompt in action than cocaine, but not so persistent.

Fourth—That adrenalin can be relied upon to counteract the primary effects of cocaine, but where over-doses of cocaine are used it is not sufficiently persistent to be relied upon as an antidote. I believe its primary effects as an antidote are from two causes. (a) That of its being a cardiac stimulant, due to its blood pressure raising property. (b) That of producing ischemia, thereby retarding the entrance of the cocaine into the general circulation, thus preventing the full effects of the dose of cocaine immediately after injection.

Fifth—That the addition of adrenalin chloride to our cocaine solutions allows us to increase the dose of cocaine given, to within a reasonable limit.

Since my discovery of the advantage of adrenalin chloride as a solvent for cocaine in pressure anaesthesia for pulp extirpation, and its publication, I am in receipt of many letters, too many to attempt replying to each, and I take this means of replying to all. About one-half of the letters were in the strongest terms of commendation, while the remainder were from those smarting under the lash of failure. The majority of these failures are due to faulty manipulation, which each can overcome by witnessing a successful operation by some one in his locality, who is succeeding. Again, I know that all will succeed much better with a cocaine tablet which has no dilutant and is very finely divided, before compression by long trituration.

Such a tablet has recently been put upon the market, at my request, and I hope all will give it a trial. It is made by Park, Davis & Co., Detroit, Mich., and is their No. 150. This aids me materially in the operation and I have heard only the best of reports from its use. In closing, let me request some of those who are using the method with success to report accordingly through the journals.



The Orthodontia of the Old School.

By ANNA HOPKINS, D.D.S., St. Louis, Mo.

Read before the American Society of Orthodontists at Buffalo, December, 1903.

For several years I have been much interested in models of cases of malocclusion that are sent in large numbers each year to Dr. Angle, together with letters asking advice in the matter of treatment, and it has occurred to me that it might be of interest and profit to you, members of the new school of orthodontia, to have a few of these brought to your attention for your discussion. They are of interest to us because they show how the old school of orthodontists regards the science, and of profit because they may open our eyes to some of our own shortcomings, and encourage us by their many imperfections to a greater effort to perfect our own work.

I wish in the beginning to say, however, that they are shown only in the kindest spirit, and if they seem to suffer in comparison with the products of the orthodontists of the new school it is not that we would hold them or their makers up to ridicule, but that in seeing where they are wrong, we may know better what to avoid ourselves; that by their wrong methods we would be more clearly directed to the path of truth and right methods.

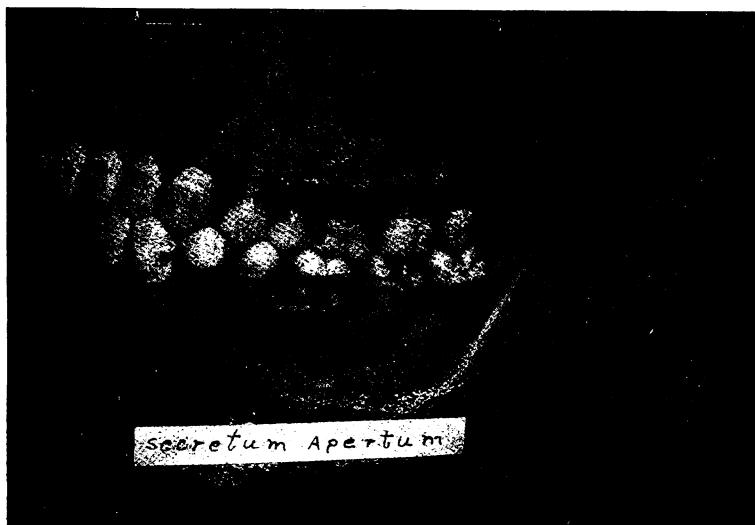
The new school recognizes in orthodontia a very high and a very arbitrary standard, but one not of its own making. It is, the teeth in



normal occlusion, which is, as to arrangement, teeth in perfection—a very high standard indeed. (See Fig. 1).

We recognize that if for any reason, such as the extraction or non-eruption of any permanent tooth or teeth, we are unable to produce normal occlusion in treatment our result is not a complete success; that if we do not have normal occlusion we must have malocclusion to a greater or less degree.

That the orthodontists of the old school do not recognize any standard higher than the placing of teeth in "regular rows" their models and



their words clearly testify, yet we know that all of the teeth of each arch may be regular as to alignment and yet every tooth be in malocclusion. They do not recognize occlusion—the basis of all dentistry—and they cannot, therefore, realize that a consideration of the facial lines of their patients is second only to that of the occlusion of their teeth; that the mouth is as essential as any other feature to the harmony and beauty of the face, to its balance and proper proportion, nor that the mouth is oftener out of balance and out of harmony than any other feature; that the facial lines are marred just as often as malocclusion exists, and just in proportion as it exists, and that they often have it in their power to mould the mouth from lines of ugliness to those of beauty. If they did they would know that good photographs of at least the profiles of their patients' faces are as necessary to send for intelligent diagnosis of their cases as

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accurate models of their teeth, not quartering views which tend to disguise the deformities, nor of a plaster cast of the face, which can by no possible means be an accurate or sufficient basis for determining the extent of in-harmony or lack of balance of the facial lines. We must study the face in relation to and as a part of the lines of the whole head, and to try to study them only in part from a cast of the face is like trying to study the malocclusion with a model of only the upper teeth. For intelligent



FIG. 2

study we must have a *full side view* of the patient's head, sharp and clear, showing everything even to the freckles on her nose, as in Fig. 2.

Again, if the orthodontists of the old school realized the absolutely essential character of occlusion and of facial lines, in other words, if they knew what the science of orthodontia really is and what its requirements are, they could not be content to make slipshod models from inaccurate plastic or wax impressions, showing only the crowns of the teeth, as in Fig. 3, or parts of the crowns, as in Fig. 4. They would know that the alveolar process, being the most important tissue with which we have to deal, must be shown in the models as far up (in the upper) and as low down (in the lower) as the attachment of the muscles will permit, as in Fig. 5, and that they must also show not only the positions, relations and articulation of the tooth crowns, but the direction and inclination of their roots labially, buccally and lingually, as well as the occlusion from the lingual aspect.

ITEMS OF INTEREST

Another important matter that they of the old school entirely overlook, chiefly because they do not understand occlusion, is the value and importance of individual teeth. We know that ideal occlusion is forever lost the moment a single tooth is extracted. They do not hesitate to extract any tooth from a lateral incisor, bicuspid, or first molar, to all four

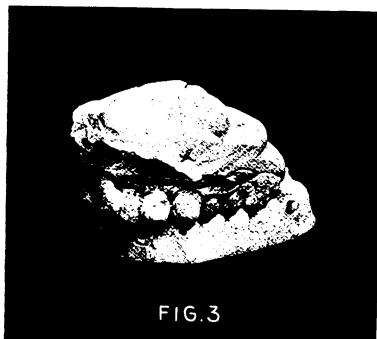


FIG. 3

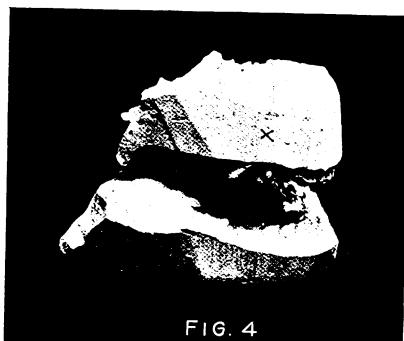


FIG. 4

first molars, or even to one first molar and six bicuspids, as shown in Fig. 6.

Their models would indicate that orthodontia has no scientific meaning to them; their letters would seem to indicate what it does mean—merely a

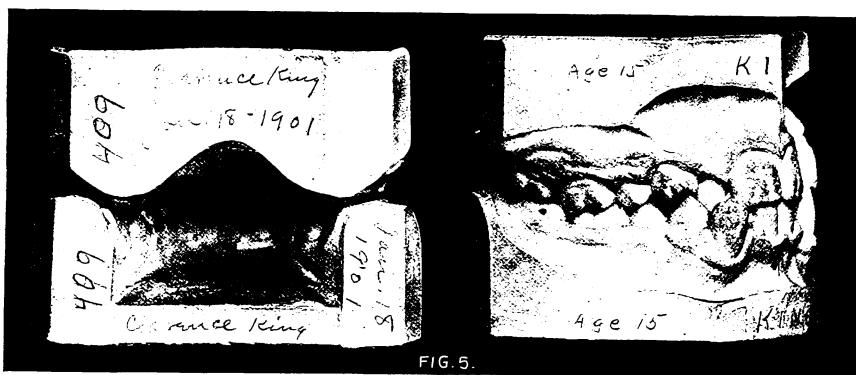


FIG. 5.

matter of appliances, and—fees. Here are extracts from a few of them that are typical of all. One says:

“I send you a model of a young lady’s teeth. I am not sure that I know what to do and take the liberty to write to you for advice. The missing teeth (lateral incisor and first bicuspid) were extracted some two months ago.” The case is shown in Fig.

**Letters
from Dentists
Seeking Advice.**

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7. Could the writer have given more convincing evidence of his lack of knowledge of the very elements of orthodontia? And yet he hopes to receive in one letter of advice sufficient instructions to enable him to successfully treat the case he has ruined at the very start.

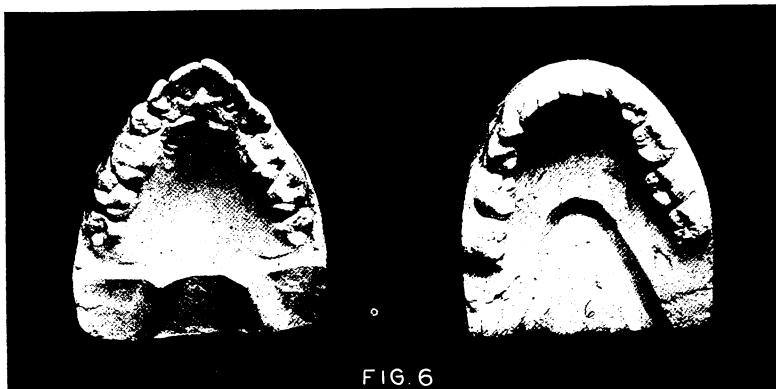


FIG. 6

Another writes: "I send you by this mail the models of two cases for regulation. The patients are sisters, fourteen and eighteen years old. The question with me is the best way to correct the difficulty. In the case with the protruding lower jaw will it not be best to use the head appliance to

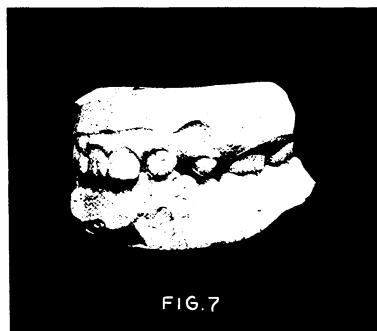


FIG. 7

draw the jaw back? I would like to know the time it will take to correct and what appliances you would use, and the charges to make them." Both these cases are shown in Fig. 8. Difficult cases, both, yet without a word concerning occlusion, no reference to the loss of a first lower molar in each case, no mention of facial lines; his questions refer only to "time required," "appliances," and "charges."



ITEMS OF INTEREST

Another says: "By this mail I send you a case of orthodontia and would ask you to kindly give me your opinion and mode of procedure for regulating same, if practical, and a certain assurance of success. I am practically inexperienced in the line of orthodontia, having had only a few cases in my practice. . . . The patient is a girl of thirteen years, upper lip short. Notice that a bicuspid has been extracted on either side above (also on the right side below); molar (upper first) on left side decayed, broken down somewhat." The case is shown in Fig. 9. It would be something gained for humanity if colleges would only teach their students to keep "hands off" in cases where they acknowledge at least their "inexperience."

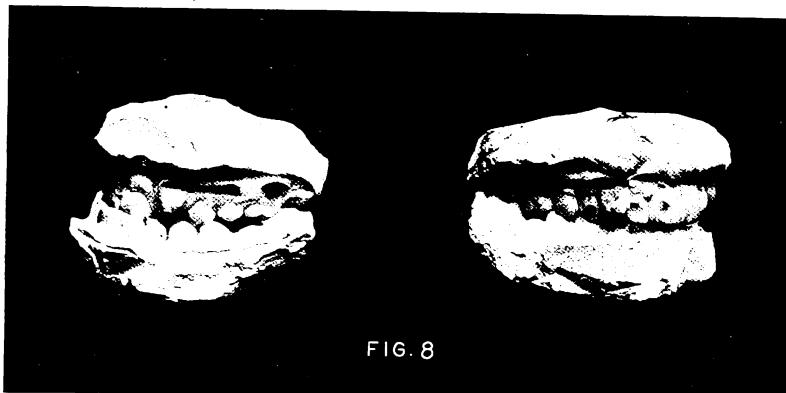


FIG. 8

Malocclusion, pure and simple, is bad enough, but when it is complicated by needless and inexcusable extraction by men who "ought to know" the condition becomes pitiable indeed.

Still another writes "I send you by today's mail models of a case of a young lady of my town who is very anxious to have her teeth regulated and wanted me to undertake it. Her case is extensive and complicated, and I do not feel competent to undertake to regulate her case, having had but little experience in this branch of dentistry; hence I send models to you and ask your advice in her behalf. The young lady is twenty-two years old. . . . How long would it take to regulate her case and what should I charge her?" This case is shown in Fig. 10. The case is indeed "extensive and complicated;" too extensive and too complicated to be undertaken by one of little experience and less real knowledge and appreciation of the true condition and what is necessary to restore the case to normal occlusion.

And finally we have the following: "I wish for advice in a case I wish to get a regulating appliance made for. For cut nearest like case see Harris's Practice, tenth edition, by Gorgas, page 415, Fig. 195, right central

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sitting in more edgewise than in figure, if any difference. The lady is about twenty-five years old. It will not be convenient for me to see her often after the appliance is adjusted in the mouth. I would like it made in such a way that it might be easily adjusted to other cases hereafter, provided it can be done as well. How long a time do you think will be necessary to complete such a case? Please give me the cost and I will send models. Would like it as cheap as it can be done to fill all requirements."

These are examples of hundreds of letters and models sent yearly for advice on this subject—letters and models that expose not only a surprising lack of knowledge of true orthodontia, but a more surprising

The Old School Criticised.



FIG. 9

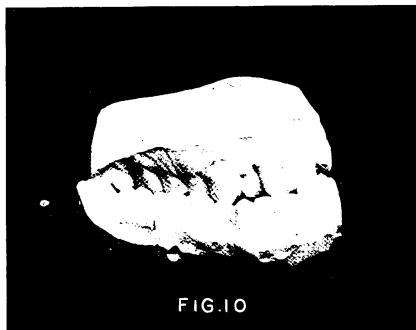


FIG. 10

ignorance of this lack of knowledge. No honest man with a scientific knowledge and understanding of real orthodontia would extract seven teeth or even one tooth, from a full set of teeth in a case he was treating, as has been done in cases illustrated. No honest man would undertake to treat a tooth or fill a tooth or crown a tooth if he had not first made a special study of the subject and had had experience previously under instructors, yet we find them here wishing to undertake the most difficult cases in the most difficult branch of dentistry, while displaying a woful lack of special knowledge, and admitting their inexperience. We do not doubt their honesty. We know they are doing just what they were taught to do in dental colleges. In all dental subjects except orthodontia they probably had careful teaching and practical experience, but they were taught that orthodontia was an unclassified, chaotic muddle of crooked teeth, "beginning nowhere and ending nowhere," and many of them doubtless never saw a case of malocclusion even incorrectly treated.

And we will have an "old school" that will go on treating malocclusion in this way and extracting sound, beautiful teeth at random, not only not knowing they are working irreparable injury to their patients, but be-



lieving they are benefiting them, just as long as we have dental colleges that teach orthodontia in this slipshod unmethodical way. And as long as men accept these teachings, orthodontia will not and cannot progress, for they are not orthodontia. They are something—nothing; worse than nothing. Orthodontia is a science—a definite science, founded on a natural law. In treatment it has a definite aim, pursued in a logical manner by definite means, and if the aim is accomplished the result is a success. If it is not, the result is not a success. This aim is to place *all* of the teeth in normal occlusion and the result, if this be accomplished, is to place the teeth and the muscles of the mouth in a position and condition to perform their normal functions—their functions normally; to give to the face its normal contour; and to aid in the restoration of normal respiration, which is usually disturbed in cases of malocclusion, especially in cases belonging to Classes II. and III.

This is the true orthodontia—the orthodontia in which the “new school” believes. And this orthodontia will benefit humanity, not mutilate and deform it; and it will benefit its practitioners, for it is far more enabling to build a beautiful structure than to tear it down or injure it.

Discussion on Dr. Hopkins's Paper.

To old teachers like Dr. Guilford and myself the matter presented in this paper is not new, although it may be to some of you. I have been getting just such models for many years; and some of them much worse than those Dr. Hopkins has shown us. The question is what shall we do about it. I have always been very charitable in this matter; and whenever I get such a model I send it back and ask for a better one before I will give any advice. I always give my correspondent to understand the importance of having good models in cases of this kind. Possibly you may feel that it is beneath your dignity to take notice of such things, but these models come from people who are in earnest. You might say that they do not know any better, and that is the truth; but they are in earnest, and if we are to do our whole duty we must explain matters to them and teach them how to do better. Mr. Elliot Hubbard has said that no man is educated until he is dead. Most of us are learning something all the time, and these people must be educated all the time. Why should we not avail ourselves of the opportunity to do something for these unfortunate patients through their dentists. We cannot tell what may be the result of a little time and labor spent in starting them in the right way. It may result in bringing into the fold of the orthodontists a man of whom we shall be proud in the future. It is my custom generally to answer these men to the best of my ability.



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Of course, I do not give them the details as to how I would do the work, but I give them advice on how to do their patients some good, calling their attention to the literature on the subject, and giving them suggestions which will put them on the right track. I do not make appliances for them but sometimes outline the treatment after giving a diagnosis. Those who appreciate the value of good models know that it is impossible to do good work, or intelligent work without them; and if we can impress this fact on these men we are doing work of which we may well be proud. I suppose that Dr. Angle gets so many inquiries of this sort that he becomes weary of it, especially when the models are very bad and the data insufficient. Here is where we can do something to develop this specialty in the proper way, and we ought to do it, as it will certainly bring large returns, not perhaps in fees, but in a broader culture and new interest in the subject. Would it not be a good piece of work for this organization to take up the dissemination of suitable literature on the subject of impression and model making? There is hardly one man in five hundred who appreciates the value of good models or knows how to secure them. Let us raise a committee to write a tract which we can send to every dentist in the country, or write it up, or demonstrate it in every local society, so as to get it in the journals.

I enjoyed this paper very much indeed, especially

Dr. H. A. Fullen, because it comes from one of our lady orthodontists.
Buffalo, N. Y.

Dr. Hoff's statements are true, but, personally, I have had but little success follow my efforts in the direction he mentioned. I had been conducting a sort of correspondence school, but I find that the correspondence usually ends with my answer to the first letter I receive. Probably this is because I point out so many difficulties in the case that the dentist does not care to undertake it. Certainly, I would not care to continue the correspondence for a year or two, telling him just how to do it. That is neither a good nor feasible plan of education.

I receive three or four such models every week,

Dr. A. E. Webster, but in no one case do I refuse to give all the information I have on the matter, and I give the very best advice I can. Of course, I usually refer them to

some text book, and as I have a faculty of remembering where I have read some article bearing more particularly on the case, I refer the man to that. I refer him to everything within his reach. I do not instruct him to go ahead with the case unless I am convinced that he can do the work. In most cases it is better to advise him to let it go and take an easier case.

We have had two men who are connected with

Dr. Young. colleges tell us that they often get such models as





these. Evidently these models come from men who have graduated from the schools which these gentlemen represent. That must mean that the colleges are not doing their duty in the teaching of this work or their graduates would know better how to take a good impression, and make a perfect model.

Dr. F. M. Gasto,
Columbus, O.

Speaking of poor models, I do not believe it is always a case of inability on the part of the dentist to make models. Most of them could make better models if they thought it necessary. Nor do they appreciate the value of good models in this work. All they try to do is to get an impression of the crowns of the teeth, deeming that to be all that is necessary. If, as has been pointed out, they could understand the necessity and importance of facial lines, and all else that is necessary for us to know in our work, I am sure that they would send us better models when asking for advice.

A Classification of the Principles and Forces of Retention.

By DR. M. DEWEY, Keokuk, Iowa.

Read before the American Society of Orthodontists, Buffalo, 1904.

No one thing has done more toward advancing science than has classification. Wherever we have found classification of knowledge, we have seen advancement; where we have found system and order we have observed success; where lack of arrangement, we have found failure.

Importance of Classification.

No one thing has contributed more toward placing orthodontia where it is today than has that one thing, classification. Not only have causes of malocclusion and regulating appliances been arranged in order, but individual cases of malocclusion have also been classified so as to enable us to speak of them with a certain amount of comprehension not known in former times.

Anchorage has been arranged and classified so that each term denotes some idea to those who have given it study. It was to an extent due to a certain form of anchorage that the practice of orthodontia has been revolutionized—I refer to the "Baker anchorage."

When we reach retention we find no such classification as has been applied to the other departments of this subject. It has been ignored in part and left to take care of itself. Much has been said in the past in regard to regulating appliances and treatment, but little has been mentioned about retention. I consider retention of equal importance with tooth movement in the correction of malocclusion, for if we fail to retain the teeth in

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their corrected position, what have we gained? Many results of cases reported in the journals indicate the condition immediately after the appliances for tooth movement have been removed. But very few show the ultimate result, and I am afraid that in many cases the results were not as favorable in after years when they should in reality have been better than they were immediately after the removal of the retainers.

My attention, as a teacher, was called to this lack of classification for I found it far more difficult to impart as good an understanding of retention as of the preceding subjects. Therefore after much thought I concluded that retention might be classified as well as had the forces of occlusion, etiology of malocclusion and anchorage.

Retention may be defined as an applied force to

Retention Defined. maintain certain relations between certain objects.

Under this definition might be placed the retaining fee paid to the operator by the patient to maintain certain fixed relations as to temperament, character and time of appointments. Retention in orthodontia is force applied to teeth in order to hold them in certain relations to one another.

These forces of retention are of two kinds, viz.: natural and mechanical.

The natural forces are those exerted by natural laws. They are by far the most important, yet they have been the most ignored and misunderstood in the past and consequently innumerable failures have resulted. Teeth returning to their former position, and sometimes even to worse positions than they occupied first, may in most instances credit their return trip to a neglect on the part of the operator to reckon with the natural forces of retention. Many cases of malocclusion are simply the result of a disturbance of or tampering with Nature's laws and no matter how well you may have seemingly corrected such malocclusion, if you have failed to enlist the natural forces of retention, you can never hope for success in the fullest degree.

These natural forces are as follows:

1. Normal muscular pressure.
2. Harmony in the sizes of the arches.
3. Forces of the inclined planes.
4. Normal interproximal contact.
5. Normal alveolar process and periodental membrane.

In normal muscular pressure we have the symmetrical and harmonious force exerted by the tongue, lips and cheeks. If these act normally, not only are the teeth held in their positions but the sizes of the arches are also maintained, resulting in a well-balanced face. On the other hand if this force acts abnormally, it forms one of the most potent





causes of malocclusion and mars the facial lines. It then follows that if we desire to correct a case of malocclusion in which abnormal muscular pressure is an etiologic factor, this disturbing element must be corrected unless the old story of teeth "going back in spite of prolonged mechanical retention" should again disturb our peace of mind.

Harmony in the sizes of the arches expresses the relation which one arch bears to the other. There is always a certain degree of force exerted by one arch upon the other during the entire life of the individual. If one arch be too large or too small, having been made so voluntarily or involuntarily, a compensating abnormality will be found in the opposing arch. Therefore, no matter how nicely the teeth may be arranged in their respective arches, unless the opposing arches harmonize with one another no permanent success can be expected because this natural retentive force has not been established.

So much has been said in recent years of the in-

Inclined Planes. clined planes that it is needless for me to give any lengthy comment on these as a natural force of reten-tion. It is a force ever present during mastication as well as when the teeth are at rest. While it is a great force for good, it is equally as great in producing so-called harm when applied incorrectly. If these inclined planes come in proper contact every time force is brought to bear on the cusps, their influence will tend to retain the teeth in their position. No inclined plane is so small or so insignificant that we can afford to overlook it in our work. It is the force not comprehended at all by men who ad-vo-cate extraction for the prevention and correction of malocclusion.

The next natural force, viz.: the normal inter-

Interproximal Contact. proximal contact is of equally great importance as those before mentioned. It has scarcely been spoken of in the past, probably because writers have failed to recognize its independence from the force of the inclined planes. By the force of interproximal contact is meant the force one tooth in an arch exerts upon its approximating teeth. This force is passive to a certain extent. It may be illustrated by the blocks of stone in an arch of masonry. The contact point being only a point on a nearly round surface, is to a great extent like the point of contact between two spheres. If force is brought to bear from one to the other, directly parallel in line with their diameters they will remain sta-tionary, but if applied at different angles, they will roll. If once the interproximal contact points of the teeth are moved out of line, the teeth tend to move further. Often we see cuspids and premolars in torsal oc-clusion when really the inclined planes are not out of harmony, but, because the contact points are not in proper relation, the teeth slip on one another to a certain extent. In cases of extraction the teeth move in the

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arch because they have lost their normal approximal contact, yet the relations of the inclined planes are not always disturbed. The tendency of the lower cuspids to return to old positions of torsal occlusion can be explained in this way. It is impossible for me to see how any one who is familiar with these forces can advocate extraction and expect to get even a fair result. In all cases of extraction one or more of the natural forces of retention are disturbed.

The force derived from a normal periodontal membrane and alveolar process is of much importance and must be studied during the entire treatment of a case. We must be familiar with its structure from an histological and physiological standpoint so that no permanent harm may

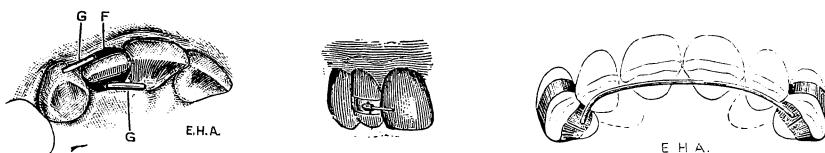


Fig. 1—Simple Retention.

be done during treatment. In cases of malocclusion caused by diseased periodontal membrane and alveolar process, no matter how long the teeth may be retained, if the physiological conditions have not been established the case is one for permanent mechanical retention.

Mechanical forces are those exerted by artificial means. They should only be employed in a manner to assist the natural forces. While mechanical forces must be used, they are but second in importance. I have classified these as simple retention, reciprocal retention, occlusal retention, occipital retention; occlusal and occipital forces of retention having subdivisions.

Simple retention is obtained, Fig. 1, by attaching a tooth which has been moved to one which is already solid in the arch, in order to get sufficient force to hold the moved tooth until the natural forces can be established. In applying force in retention, it should be "applied in the direction of the backward tendency."

Reciprocal retention is the pitting of the backward force of one tooth against another having a tendency to move in an opposite direction. In this we have two divisions, viz.: simple and compound.

Simple reciprocal retention, Fig. 2, is applicable in cases in which the backward tendency of one tooth is pitted directly against the backward tendency of another. Take for example a case in which the incisors have



been rotated in opposite directions and one tooth retains the other by means of retaining devices so attached.

Compound reciprocal retention, Fig. 3, is indicated whenever certain teeth are retained by force exerted from some other teeth which have a tendency to move in different directions. In this form of retention other teeth than those to which the retaining appliance is attached are also being



Fig. 2—Simple Reciprocal Retention.

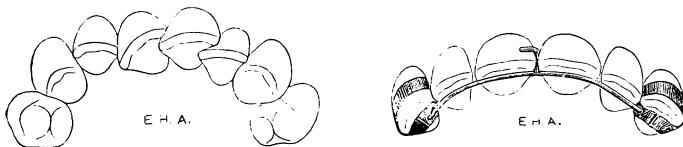


Fig. 3—Compound Reciprocal Retention.

retained. Although some portions of the device may rest against the teeth yet it is not rigidly attached. For example of this class I would cite cases in which the six anterior teeth are being retained when bands are only placed on two of the teeth. By careful study of this division of retention we will be enabled to eliminate a large amount of unnecessary bulk in the form of bands and spurs for the benefit of our patients and still preserve our work.

In occlusal retention the force of the teeth in one arch is pitted against the force of the teeth in the other arch. Of this class we again have two divisions, viz.: simple and stationary.

In simple occlusal retention, Fig. 4, the backward tendency of the teeth in one arch is pitted against the other. The appliance is so attached that the teeth may tip to a certain extent. While this plan is very useful, it always requires watching.

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In stationary occlusal retention, Fig. 5, the appliance is attached to the teeth in a manner compelling them to move bodily if they move at all.

These forms of occlusal retention are employed when the mesio-distal relations of the arches has been changed. In the construction of stationary occlusal retention the same plan is followed as in the construction of stationary anchorage. The appliance is so placed and fitted to the teeth

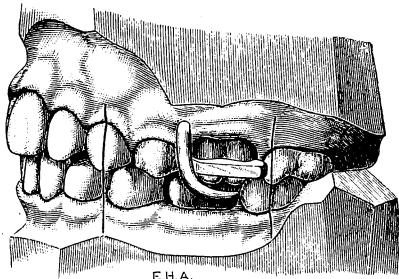


Fig. 4.

in one arch that when the force is brought to bear from the opposing arch the teeth are held rigidly and no movement is possible except to move them bodily through the process. While this device occupies more space in

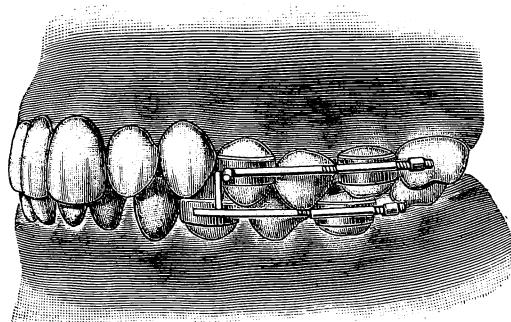


Fig. 5.

the oral cavity than the simple occlusal retainer, it will be found to be of an advantage in retaining cases of "Class II." treated by moving the mandible forward. The disadvantage, in the past, to this plan of treatment has been the difficulty of retention which is overcome to a great extent by stationary occlusal retention. The success to be had from the use of this plan of retention will depend upon the rigidity which the manner of its construction will afford.





In occipital retention the force is obtained from attachment made to the occipital portion of the head. It is too old a method to need our attention at this time.

Mechanical retaining devices are of two kinds, namely, removable and fixed. Removable appliances are those which the patient can remove from the mouth at will. Fixed appliances are those attached to the teeth in a manner preventing removal by the patient. Each kind has certain advantages not possessed by the other.

My object in presenting this paper was to render retention more easy of comprehension since it is one of the most important subjects in the treatment of malocclusion.

Report of Two Cases in Orthodontia.

By A. H. KETCHAM, D.D.S., Denver, Col.

Read before the American Society of Orthodontists, at Buffalo, 1904.

In compliance with Dr. Angle's request to his former students, I will endeavor to give a report of two of my cases, one of which, I believe, is a failure, measured by modern art standards.

They are two badly mutilated Class 1 cases. Treatment was begun on both at about the same time.

In the first case, Figure 1, the right upper molar was lost at eight years of age, the left at about fourteen years, and after a futile attempt at regulating, the right upper lateral was also extracted. The lack of development of the alveolus in the region of the cuspids and incisors is pronounced, especially in the upper.

In Figure 2, the upper lip is short and lacks fulness. Figure 3 shows improvement in the upper lip, as it is now longer and curves outward in harmony with the curves of nose, chin and forehead.

This was brought about by placing each tooth in its proper occlusal position, Figure 4. The lost teeth were replaced by artificial substitutes on the retaining plate.

In the second case, Figure 5, the upper first and second molars and right second bicuspids are missing, as are also the lower cuspids.

The remaining teeth were affected with pyorrhea alveolaris, which entirely disappeared after receiving the proper treatment.

The next consideration was the method of treatment to improve the occlusion; the upper arch was narrow coming to an angle at mesial corner of central incisors and depressed lingually in region of bicuspids, the

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mouth having a high narrow roof, sometimes described as a V or saddle arch by the old writers.

The lower arch was constricted, the crowns of all the teeth slanting

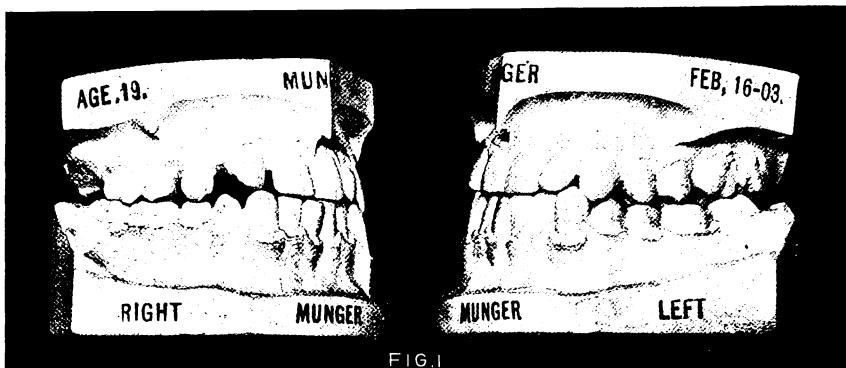


FIG. 1



FIG. 2.



FIG. 3

lingually, with the exception of the canines, which had been extracted because they were outside of the line formed by the incisors and bicuspids.

The face is long and appears narrow, which is accounted for by the lack of development of the arches. Looking at the full face it is seen that the crowns of the central incisors are not covered by the upper lip.



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In the treatment of this case (Fig. 5), I was obliged to take into consideration the physical condition of the patient, as he came to Colorado in search of health and even a slight disturbance to his nutrition might cause a return of the old trouble.

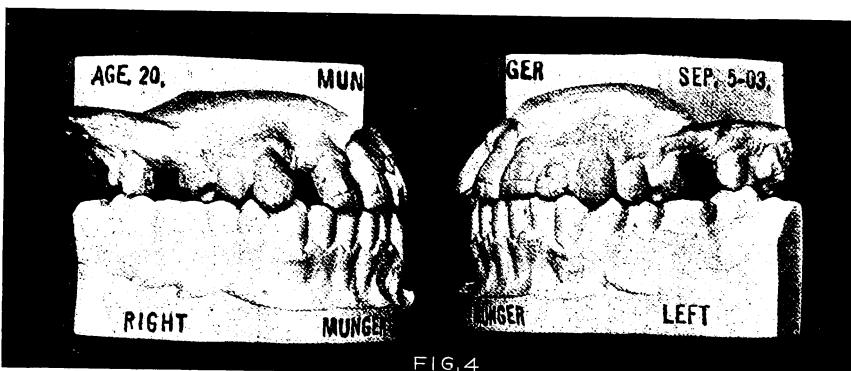


FIG. 4

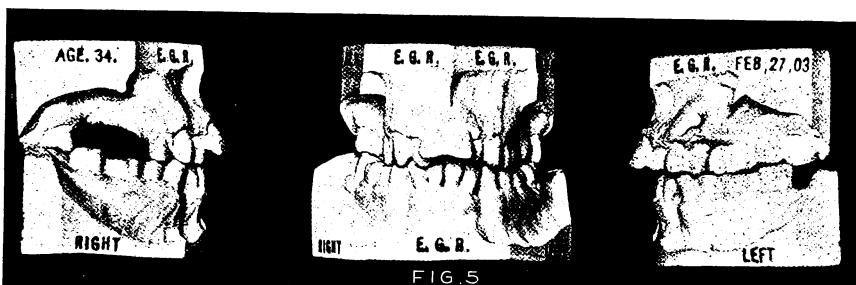


FIG. 5



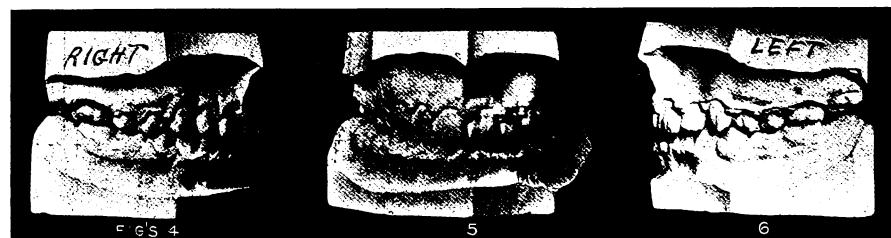
FIG. 6

After explaining the proper course of procedure, viz., expansion of both arches and replacing lost teeth, with the consequent improvement in the contour of the face, and the shorter method of moving back the pro-

truding upper incisors without correcting the lower arch, finding the patient strongly against the first method, I decided to follow the second course. I removed the crowns, which supported a bridge, from left upper third molar and second bicuspid (I afterward removed the second bicuspid with my fingers, and placed D bands on the third molars, and expansion arch in place. I moved the first bicuspids and cuspids distally to their normal position, the width of one tooth, and by means of Baker anchorage moved the incisors back, Fig. 6.

The incisors are retained by a piece of G wire resting on their labial surface with the ends passing between laterals and cuspids and vulcanized into the retaining plate, which carries teeth replacing lost molars and bicuspids.

The teeth seem quite firm in their new position now. (Nov. 30th.)



Report of Cases.

By Dr. F. C. KEMPLE, of Erie, Pa.

Read before the American Society of Orthodontists, at Buffalo, 1904.

The two cases which I wish to report to the Society are interesting to me because they both belong to Class No. 2, Division 1 (Angle Classification), and neither of them, so far as I am able to learn, has ever been associated with mouth breathing.

The first case—Figures 1, 2, and 3—a boy, age 14 years, physically well developed, gave no history whatever of mouth breathing.

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The father and paternal grandfather were afflicted with malocclusion of the same class; other members of the father's family showing a tendency toward the same malformation.

Figures 4, 5 and 6 show the case immediately after the regulating appliances were removed.



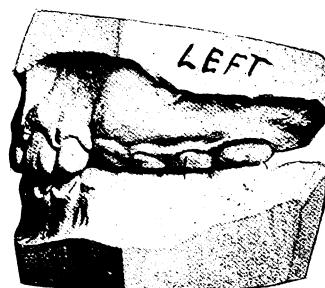
FIG'S 7



8



FIG'S 9



10

The second case—Figures 7 and 8—boy, age 9 years; perfectly strong and healthy, no history of mouth breathing, but an habitual thumb sucker from infancy. He was still possessed of this habit when presented for treatment.

Figures 9 and 10 show the completed case.

Neither case is peculiar in any respect except in the non-association with mouth breathing.

Report of Cases.

By Dr. NORMAN G. REOCH, Boston, Mass.

Read before the American Society of Orthodontists, at Buffalo, 1904.

I have pleasure in presenting for your consideration two cases which present some points of interest. I will describe them very briefly with the aid of photographs.

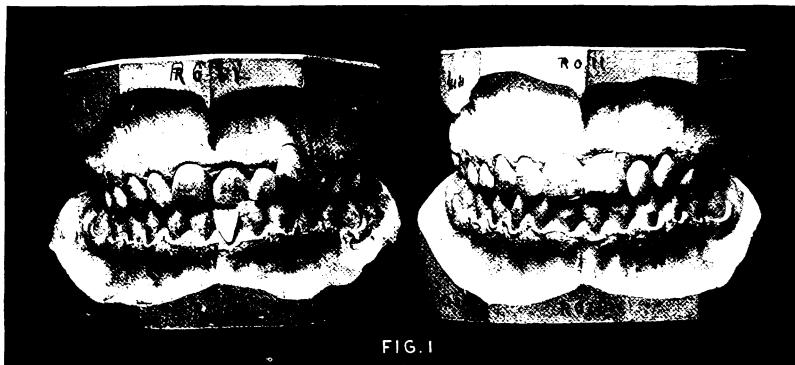


FIG.1

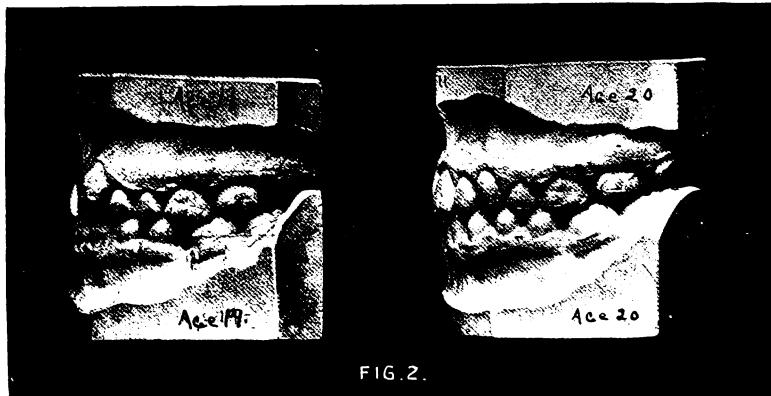


FIG.2.

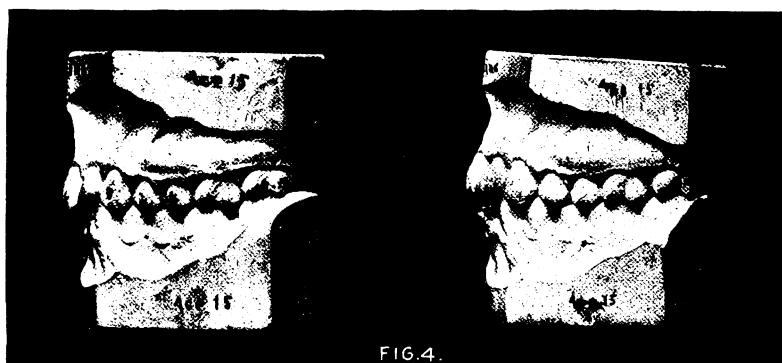
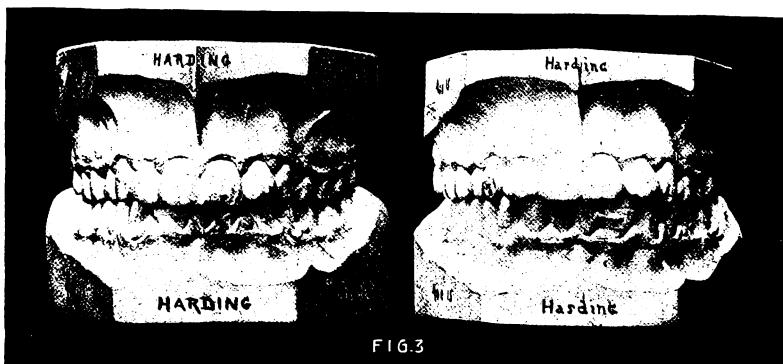
The first case is that of a young lady, 19 years of age. She had suffered by the loss of three of the first molars. This case falls under Class II., subdivision of Division II. No attempt was made to remedy the distal occlusion of the left side. In regulating I simply sought for an "improved occlusion." Figure 1 shows the front view of models before and after treatment. The model to the left shows the malocclusion of the an-



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terior teeth. The upper left central incisor is in lingual occlusion, and the lateral slightly so. The upper left cupid is in pronounced labial occlusion, greatly marring the facial expression.

This case was already horribly mutilated by extraction. So I deemed it best, under the circumstances, to sacrifice the upper left first premolar to accomplish the desired results. The retraction of the cupid was effected



by the distal spring of the arch, that is, the tendency of the arch to slide distally through the tubes of the anchor teeth when properly bent. This force was assisted by the ligation to the arch of the two incisors in lingual occlusion. Rubber wedges were constantly kept between the arch and the cupid tooth. The cupid was retracted easily by this means, but not as rapidly as it might have been done had the traction screw been employed. The relation of the molars was not disturbed as sometimes occurs in the latter method.

Figure 2 shows a side view of the models. The cupid was retained

by ligating with a brass wire ligature to the second premolar. The occlusion was sufficient for the retention of the central and lateral incisors.

Figure 3 shows front view of models of a case in Class I. This case called for expansion in the cupid region in the upper and lower arches—rotation of upper laterals—and rotation and labial movement of lower incisor. The necessary movements were effected by the usual appliances e. g.—anchor bands, arches, wire ligatures, and spurred bands.

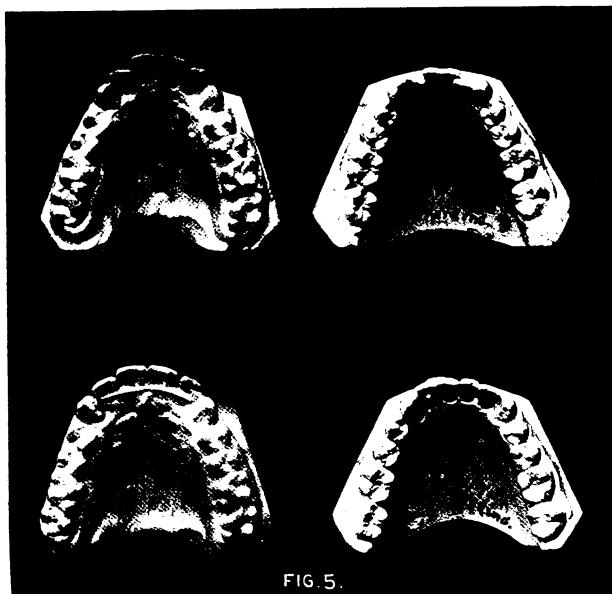


FIG. 5.

Figure 4 shows a side view of the models. It will be noticed in this picture how the labial movement of the lower incisors has opened the bite—or brought the line of occlusion where it belongs.

Figure 5 shows the occlusal aspect of the case.

The appearance of the upper left lateral in Figure 3 (completed case) suggests the thought that it is in labial occlusion. I will say that this is more apparent than real, as may be seen by comparing with the other pictures; there is not the sharp, well-defined mesio-incisal angle present in either of the upper laterals, but they are rounded and characterless.

I regret exceedingly that I have not the picture of the faces to show in these cases.



The Importance of Specialization.

By MR. ELBERT HUBBARD, East Aurora, N. Y.

Abstract of lecture read before the American Society of Orthodontists, Dec. 31, 1903.

Some months ago I visited the city of Cremona, in Italy. The name and fame of Cremona are deathless because of one man who lived there about two hundred years ago. That man was Stradivarius. In his youth, when only sixteen years of age, Stradivarius was apprenticed to a man who made musical instruments. The name of that man was Amati. He made violins and harps. He made instruments to order; two strings, four, six, a dozen, a hundred. People at that time had an idea that the more strings a harp had the better it was. The more strings you had to play upon, the more music you could make. Fallacy! You can play on only a certain number of strings. We hear of harps having a thousand strings and the men who made them thought that a harp with a thousand strings would produce better music than one with four strings.

It was left to Stradivarius to discover that a violin should have four strings, and no more. That a violin should be just so long, and that it could not be extended two inches without losing in tone, quality, in value, in service, in beauty, in music. A violin must have a bridge just so high; a back of maple or hard wood; the front of soft wood. It should weigh so much, and no more. He began making violins when he was only sixteen years old; he did not make a violin that pleased him until he was fifty-six. For forty years he worked to produce a perfect violin; and he made a perfect violin two hundred years ago. And there has never been a better violin made since his day.

You all know that the piano is an imperfect musical instrument. Constant improvements and changes are being made in pianos, but there will never be a better violin made than that made by Stradivarius. And yet every Stradivarius violin is different. No two violins are alike. Where a man works in liberty and freedom, and thinks a thing out with his head, and makes it with his hands, he never duplicates. God never duplicates, and God works through us. I am the instrument of God.

Stradivarius had two pupils. He had many pupils; but he had two, in particular, who lent luster to his name as a teacher. These two were the Guarnieri brothers. And Joseph made violins as good as the master, but they were different violins. And when you visit the cathedral at Cremona, the janitor will take you up into the belfry and show you where Stradivarius stored the wood that absorbed the sweet sounds of sacred bells calling men to prayer. You will see the cathedral where Stradivarius

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played his violin. He thought that cathedrals were built to test violins. He said that hell is the place where bad fiddlers go.

And so he tested his violins in the cathedral. And he used to have his young men go there and play the violin. They played high up in the belfry, and monks and bishops were there. They were very gentle with this man, and said "he is not just right in his mind. He thinks he makes violins to the glory of God."

It is a beautiful idea that we work for the glory of God. The individual who does a thing as well as he can, puts his heart and soul into his work, does this work for the glory of God. It is sacred work. But the monks did not reason as far as that, and did not understand that this man's work was eminently religious. But they tolerated him because he made beautiful musical instruments and played them in their cathedral.

And his boys would play while he stood behind **Guarnieri.** some pillar and listened. One day, after he had completed a violin, this young man, Joseph Guarnieri, played the violin and the old man listened. And he said, "That is not my violin." He knew his children. He loved those violins, and every beautiful thing and every great thing is loved. You must put life into your work. Tolstoi said that there are those who think that you can deal with life without love; but you cannot do it.

Stradivarius knew that was not his violin. The boys were playing a joke on him. The tears ran down his old face as he said, "That is not my violin, but it is as good a violin as I can make. It is made by one of my boys." And it was made by Joseph Guarnieri, and, to-day, Stradivarius has only one rival, and that is Joseph Guarnieri.

Paginini, the greatest violinist the world ever saw, played a violin until the women who loved him gave him a Joseph Guarnieri. He played this violin for forty years on the concert stage. The violin is the only perfect musical instrument. It sympathizes with every throb of the heart; expresses your every thought, your desires, your aspirations, your hopes, your fears, and voices them. The violin is an extension of human speech. It voices the thoughts that are beyond speech.

For forty years Paginini played that one violin. Some of you may have been to Genoa and there in the town hall you may remember seeing this violin in its sealed up case. No bow has been drawn across it since the hand of Paginini has been stilled in death; and no one ever heard Paginini play except on the concert stage. A beggar boy, he played first in the streets, and finally he played in all the best theatres in Europe. He had no competitor. He could do with the violin what no one else has or can do. People said that this man had sold his soul to the devil. As if the





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devil were stronger than God. One reason why they believed this was that he used to disappear from the world. He would stay away for three months or more, and no one ever knew where he had gone. Suddenly he would come back, and he would amaze the people by the music that he would bring out of that little violin. They said that he sold his soul to the devil, and it is only recently that his secret was given to the world.

A monk died recently at the St. Bernard's monastery, a man of ninety-four years of age. On his death bed he told this: "I knew Paginini. He used to come here to this monastery, and he would stay a month, two, three, a year. He lived in a stone cell right down below, and wore horse-hair robes. What did he do? He prayed and he worked and worked. The secret of his success was that he worked day after day; hour after hour; clear into the night. He practiced. This one thing he did. He practiced."

Stradivarius succeeded in making a perfect violin because he worked; he worked. This one thing he did. He worked. Paginini succeeded because he worked. If you succeed, and if I succeed, it is because we concentrate.

We all have about the same amount of capital. It depends upon how we use it. You are heirs to a certain amount of energy. What will you do with it? Spread it out thin so that it will cover a great deal of territory? Do a thousand things? Better not do anything at all. Concentrate! The man who succeeds in a masterly way, and helps this old world along in her course, is the man who concentrates.

Now, I do not know anything about your specialty, and, I presume, that you do. But you do not know all about it. You are learning more about it all the time; you are just in school. You will never reach the ideal stage. But, I congratulate you that you are in the suburbs. You come together to tell each other what you know, and you hold yourselves up to a certain standard. You pool your knowledge, and everyone takes away all he can hold and no more. Perhaps, some do not take away anything at all except what they bring. The reader of each paper told you a few things that you knew, but perhaps, you did not know you knew them until he told you. That is the way with many of us.

But this one thing you do, and if you will work, and work, and put your very life and soul into your work, you are bound to succeed, as did Stradivarius, as did Guarnieri; as did Paginini.

Education should not be a preparation for life. Education should be life, and life should be education, and you will never finish your education while you are on earth. You are in the kindergarten of God. Colleges only supply you with a few principles. Colleges never educated any man. You cannot get an education in four years, especially when you are separated from life. Knowledge supplies opportunities, and life supplies opportunities, and if you succeed in a masterly way, it is because you concentrated your energy upon this one thing. Like Stradivarius and Paginini, say "this one thing I do."

In closing, let me give you one thought. Robert Louis Stevenson said, "I know what pleasure is for I have done good work."

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Discussion on Dr. Lewis's Paper.*

Dr. Edw. H. Angle,
St. Louis, Mo.

I hardly feel qualified to discuss this subject, but I confess that I feel proud that such a splendid paper should be read before this society. I am also pleased to have a new field of observation opened to me along our own line. We all know that malocclusion is often accompanied, if not produced, by diseases of the nose, but I doubt whether many of us have stopped to consider that it had any influence on the eye. I can now look back and recall a number of patients who also had trouble with their eyes, which it now seems to me possible may truly have been related to the malocclusion of the teeth. In the future I will consider these cases more carefully with reference to the effect on the eyes, so that I may be able to discuss this matter more intelligently than I can at this time. I am very grateful to the doctor for bringing this new subject before our society.

We have all known, either from personal experience or from a perusal of the literature, of cases of eye, nose or other facial troubles which subsequently were found to be caused by pathological conditions of the teeth. This is well established, for in most of our textbooks on pathology such cases are cited. But the subject as presented to-day, has taken a direction I never thought of before; its influence on the development of the face, and an organ so remote from the teeth as the eye. It is rather strange that we did not heretofore take into account the intimate relationship existing between all the structures and organs of the head. If the conditions of the nose and contiguous structures affect the eye in its development, why may not also the brain be affected? May not this be an important etiologic factor in the causation of nervous disorders?

Such an assumption is perfectly logical.

Dr. M. C. Watson,
Detroit, Mich.

We have always been taught that it was not advisable to undertake such operations as we have to perform upon the jaws until the eleventh or twelfth year, but that is not true to-day. We are doing a great deal for children at six and seven years of age, and we are doing something for children younger than that. If I can be convinced of the wisdom of it, I believe it possible to do a great deal for children three or four years old.

Dr. Lewis.

I have been greatly interested in the discussion upon the subject from the standpoint of the orthodontist. I would not be misunderstood in my statements. My conclusions are tentative and much careful observation will be required before they can be made absolute. The ground is new and one hesitates to venture upon it, but I have been watching for so long a time the relations between facial and ocular irregularities,

*Dr. Lewis's paper was published in the May issue. The discussion was not received in time for publication in same month.—EDITOR.





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that I cannot escape the conclusions to which these observations have led me. I am not endeavoring to prove a preconceived theory, but the theory naturally follows as a result of observed facts. I hope we may ultimately gather data which will enable us to arrive at definite conclusions as to the influence which the shape of the mouth and the condition of the teeth may have on the development of the head.

In order that our evidence may be classical and positive, it will be necessary to follow an undeveloped eye through the changes which take place under normal as well as under abnormal conditions. We have indeed seen changes take place in the eye of a growing child. We know that asymmetries of the eye are associated with disparities in form of the face. We must demonstrate, however, that given inequalities in the eyes are associated with given inequalities in the face, and that a more even facial development will be associated with greater harmony of form in the eyes. It is this line of work that will give us fundamental facts. I am merely breaking ground and outlining possibilities.

Can we then develop the face at will as we can the arms and legs? It would seem reasonable to believe that within limitations we can. But we must attack these conditions at a very early age if anything is to be accomplished. We must mold the form while the tissues are plastic. You, as orthodontists, are handicapped by the fact that until the sixth year molar erupts you have no anchorage for your morphology.

An important fact brought out in the last two years by Mr. Worth, of London, England, has changed our ideas with regard to the possibilities of developing the eye. The idea which we all held for many years was, that an eye which became blind because it had turned in, remained so. Mr. Worth began with the idea that by taking children when they were very young, the vision could be improved through development of the corresponding brain centers; children with facial disparities were given glasses, when they were required, at as early an age as two years. Then he devised an instrument called the amblyoscope, by means of which the child could fuse images and thus bring about co-ordination of the eyes and the brain centers. In a month or six weeks the eyes would straighten and then having developed fusion they would work co-ordinately. The brain cells would thus be enervated and energy carried from the cuneus to the eye, and from the eye to the cortex back and forth, would re-establish binocular vision, a restoration of sight following. Having made the eye see, the next thing is to make it grow. The reason that it turned in was that it was not in the same form and shape as the other eye; hyperopic eyes are not equally developed, and one eye usually turns in.

That was a great step in advance; the next point is to watch that eye for years and note whether we are changing its form in any measurable degree. At the same time we must see to it that there is patency of the nose; that there are no adenoids; that a normal condition of naso-pharynx is present; this is essential to normal development. But as you cannot expect to change the shape of the mouth until the seventh year, when you can get anchorage, valuable time is lost. The time to do this work really is earlier than that, because, as Mr. Worth has pointed out, the damage is done to the eye before the sixth or seventh year. The object is to direct nerve energy properly during the plastic developmental period.

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"Ethics, Literature and Hygiene." Our New Chair.

By J. D. Moody, D.D.S., Los Angeles, Cal.

Read before the Institute of Dental Pedagogics, at Buffalo, 1904.

Realizing the need of a more extended study of ethical relations than is usually given in a dental college, this chair was established three years ago by the College of Dentistry of the University of Southern California. So far as we could learn, there was, at that time, no such course in any dental college. An occasional lecture or two may have been given, but no mention of such has been made in the announcements.

There are to be found two or three apparent exceptions to this statement in the announcements of the North Pacific Dental College, of Portland, Oregon, and of the Medico-Chirurgical College, of Philadelphia, Pa. The former unites in one chair, "Dental Jurisprudence and Ethics," but it is in charge of a legal gentleman. While he probably will bring out the legal phases of ethical relations, he certainly cannot enter into all the particularly dental phases of the question, as a dentist can. The other college does not enter into ethical questions at all, but it does present an elaborate and admirable course in hygiene. This course is well worthy of emulation by every dental college, but it does not present just those points which we consider of especial value.

One other announces a separate course in hygiene, but gives no details. Of course all colleges do teach more or less hygiene in some way, but it is in this practical, interwoven way of teaching it that we believe our plan to have the advantage.

It was also felt that the debt which we owe to our literature should have recognition, and this was added to the duties of the chair.

This was all virgin ground. We had no previous experience upon which to draw, no plans which might suggest other plans. We had to





begin at the bottom, feeling our way as we went along. In the second year, owing to some professorial changes, hygiene was also added to this department, the title of which now reads: "Ethics, Literature and Hygiene."

In assuming charge of this work, the first problem which presented itself to my mind, was whether to plan for three separate divisions, or to weave them all together into one harmonious whole. The following solution presented itself:

By giving to the word "ethics" the modern, practical expression of man's relations to his surroundings, rather than the older and psychological one, I crystallized its meaning into the definition "Law of Duty." But the dentist's duty to—what?

That had to be worked out. Each year some alterations and additions have been made, and probably each succeeding year others will be made as suggested by experience, until finally it has assumed the shape we would have it.

Following is the course as it has taken shape thus far:

Ethics. Definition—"The Law of Duty."

Outline of Course. The dentist's duty to Self, Office, Patients, Profession, Dental Societies, Society (in general).

Literature. General: Library, Magazines, Papers. Dental: History of Library Journals—How chosen, How read, Writing for.

More than one-half of the time allotted is given to the consideration of the first part of this course.

These different subjects are taken up in turn and elaborated in detail in such a way as to give the class a high ideal as to the dentist's personality, his position in society and in the profession, and his duties thereto.

Throughout all this course, illustrations from actual practice are constantly introduced to emphasize the special points made.

The first section, "Duty to Self," assumes the need of a healthy body and a healthy mind as a prerequisite to a successful professional career, and outlines how to keep the one by the use of proper food, by proper exercise, occupation, rest, and personal hygiene, and the other by proper mental food, activity and associations.

The make-up of a modern dental office, in the four-fold phase of furnishings, equipment, convenience, and sanitary methods is fully illustrated.

The management of a first-class practice is explained in all of its details, including both the work done, and the relation between dentist and patient. This last point is especially considered, holding up before the



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class the ideal dentist, a gentleman always, sympathetic, firm, master of his position.

It was not considered wise to enter upon an elaborate course in general hygiene for the present, but hygienic principles and methods are so interwoven through all these studies as to emphasize their importance, and to impress upon the student the absolute necessity for their observance. This is found to answer every purpose, and in the light of our present experience we believe it to be the best plan.

The relation the dentist should sustain towards the profession and to the dental society is looked at from every standpoint; the students are urged to cultivate a spirit of professional pride, and shown how to make the most of their new relations. The ethical spirit receives especial emphasis in this section.

They are shown how much they need the dental

Dental Societies. society and how much the society needs them. The organization of a society is explained, and they are taught how to conduct one. They also receive instruction in writing papers for it; how to go about it, choosing the topic and why; what to include and what to exclude. The free and easy habits and expressions of the local society are contrasted with the dignified statements of the scientific or literary association, in such a way as to impress them with the importance of concise speaking and writing.

Dental journals are taken into the class, and at-

Dental Journals. Attention called to some article which exhibits redundancy, or irrelevant matter that should have been omitted. Verbosity, and a loose mode of expression are contrasted with terse and exact language.

The printed discussions of some society are taken up in like manner, and hints given towards preparing such for publication. The ethical questions involving speaker or writer, publisher and reader, are brought out and considered.

To make all this the more practical, the senior

College Society. class in each year is organized into a College Dental Society, which meets once a month, and carries on its work the same as any dental society. The jurors are invited to be present at these meetings, and in some ways to take part, thus being prepared to take up the management in the senior year.

Some of our meetings the past year have equaled in interest many of those of our more pretentious societies.

I am present at every meeting of this society in the capacity of a critic and counselor. If they are perplexed as to any procedure during the





meeting, I help them out, and at the close I review the work and discussions of the evening, criticizing freely, just as a teacher would a class.

Under "Literature" an attempt is made to instill **Literature**. into their minds, as professional men, a love for literature and literary associations. They are taught something of the history of dental literature, biography and art. They are counseled in regard to the selection of a dental library, when and how to acquire one, what books to purchase and reasons given therefor. The dental journals are likewise considered, their merits or "field" canvassed, and advice as to a selection given.

This is but a mere outline of our work, but it shows something of what we are trying to do. We believe there is nothing like it. We believe that in a few years' course, this department, if generally adopted, would develop into one of the greatest factors in the upbuilding of our profession.

The Value of Instruction in Dental History and Literature.

By H. L. AMBLER, Cleveland, Ohio.

Read before the Institute of Dental Pedagoces, at Buffalo, 1901.

The subject of teaching History in Dental Colleges is well worthy of our sincere consideration, because it will naturally stimulate students to want to know more of their profession's past; it will make them desire to attend societies, subscribe for journals, purchase books and read them; any or all of these may lead to the conception of ideas which will be valuable.

Teaching history affords the main opportunity for students to know of and appreciate the science, evolution and progress of the profession, and will create in them a wish to learn more of collateral branches, and this will lead to fondness for good literature in general, and make them better citizens, because they will have broad ideas, and it will also make dental graduates equal to graduates in any profession.

Teaching history is favorable to producing scientists, because it tells of what has been done, and how it was done, thus stimulating the mind of the hearer and prompting him to emulate some of the noble characters spoken of—it imbues him with enthusiasm, and he will aspire to great things.

If you impress the minds of students with history, they will have a higher regard for the status and dignity of their calling, and the impres-



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sions they will make, and the influence they will have on their fraternal brothers, and also on the laity, will redound to their honor.

History should help to guide students and to stimulate effort along lines of invention and discovery, and those who study it will naturally assist in making it.

It is for the intellectual and material benefit of the student to study history, because it makes him intrinsically greater, wiser and better, and teaches him to honor the memory of notable men.

History of the best things tends to do away with quackery and empiricism, ignorance and error, and increases our resources.

Teach history so that students may know what was done in ancient times, and where dentistry originated, and when, and by whom important discoveries in our specialty were first made, and what dentist discovered practical anesthesia, or made certain surgical operations, or applied certain mechanical principles, or wrote the first books on our specialty. One cannot be progressive without knowing more or less of history, because he might be going backwards in trying to develop some idea or material thing which had become obsolete before he entered the profession.

In order to fully understand the steps which have been taken to bring dentistry up to the present standard, one must study history, which is one of the factors that helps mold dentistry into a profession.

With the dental student, who is longing for information, everything that has to do with the history and progress of dentistry, is studied with interest, especially the rise, fall and revival of dental art; he must learn of the origin of the science and art, or he cannot determine its progress or appreciate its advancement. He should be made to feel that he owes much to those who made dentistry a profession and invented methods and instruments which he will use daily, the products of which are a necessity in every community.

The student should be taught history so that he will understand that he does not know everything, and is not in advance of all of his predecessors, but that some of their work has been relegated to him for completion.

You can interest students by occasionally giving short biographical sketches of some of our most noted men.

There is no longer any excuse for not teaching this subject as we have a text book, and also four college years of not less than seven months each, in which time can easily be provided.

**History Caught
in
Professional Schools.** No other of the learned professions omit such instruction. What would be thought of a theological school which would plunge its students headlong into the dogmas of its particular sect without first dealing





with the history of religions? Such a school would be very narrow, indeed, and yet gauged by the same rule, dentistry is more narrow than theology. What would be thought of a law school which did not teach the history, emanation and foundation principles of law? Such a school would probably give a student, by way of introduction, a case to "try."

What would be thought of a medical school which did not tell its pupils about Esculapius, Hippocrates, Galen, Hunter and others? Such a school might give a freshman a case of typhoid fever to treat.

Schools of painting and sculpture go back to ancient and medieval times for their history and ideal types.

We believe that if every college would provide for a reasonable course of instruction in the history of dentistry, showing how it has gradually evolved a literature vast and comprehensive enough to occupy all the attention of any one mind, that our specialty would be broadened because of the knowledge thus disseminated.

History shows that our profession is on an equality with several other professions, and gentlemen in these professions should treat each other in a noble manner, and in accordance with their scientific attainments.

Students should learn that dentistry has a record which they need not be ashamed of, and a literature of its own which is receiving large yearly additions; also that highly educated men of the past and present are engaged in its practice; knowing this will be a great factor in causing pupils to strive with all their powers to be a credit to their calling.

History induces in students, respect, veneration and love for their work, and impresses more than ever upon them that it is a profession.

The profession should honor the man, and the man should honor the profession, and this will be more apt to be done if pupils are told about the good things of the past as well as present. They should be taught so that the world at large will consider them as well equipped in their profession, as any other man is in his; thus he will gain standing, prestige and influence, which will be of incalculable benefit.

Some of the antagonism which has been shown towards our profession, has been directed to lack of proper literary training.

They should be taught so that they may be able to defend themselves from the attacks of those who do not appreciate the large amount of study, work and experiment which has been given for the purpose of relieving pain, preserving and restoring organs of the body, and adding to the longevity of the human race.

History helps put a man in his true position for future usefulness.



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and it is impossible to keep abreast of the times in this inventive and progressive age, without at least knowing our present and passing literature.

"The thoughtful reasoning reader will find a mine of value in history, and mentally add to his storehouse of information laid aside for the future, and the use which is made of this knowledge will depend upon the individual; one finds pabulum for future essays, another will find hints which lead him to deeper investigation and original productions."

One evidence of progress is the ever increasing interest manifested in historical research and study of collateral branches, and the profession is gradually comprehending that the proper way to learn lessons of wisdom for the uncertain future is, to give immediate attention to the events of the past. If we remain ignorant of the history of those who preceded us, we are liable to make many sad mistakes. Another evidence of the fact that history is attracting more attention than formerly we note that the National Dental Association has appointed a committee of twelve on this subject, and the "Southern Branch" has also a committee, and at their last meeting Dr. G. S. Vann, in his paper said: "A chair of dental history and ethics should be established in every college so as to develop a nobler strain of professional life."

Other evidence is that several of our colleges already teach more or less of the subject.*

"Teach history so that pupils may realize how deep down into the soil of history run the roots of the life that flourishes in the profession. Here great events have happened; here great deeds have been done; here great men have lived and flourished and labored; here the fascinating story of the growth of the profession is told."

History teaches that the dental spirit is one of unrest, full of anxious brain power, continually reaching for something better, coupled with nimble fingers, bright eyes, good judgment and perseverance, and the watchword is, and ever must be, onward toward perfection.

*Colleges which teach dental history: University of Illinois, Prof. B. J. Cigrand; Philadelphia Dental College, Chas. McManus, D.D.S.; Louisville College of Dentistry, Max M. Eble, D.D.S.; University Southern California, J. D. Moody, D.D.S.; Western Reserve University, Prof. H. L. Ambler; Barnes, St. Louis, Dr. B. L. Thorpe.





An Unexpected Possibility.

By Dr. WOODBRIDGE H. BIRCHMORE, Brooklyn, N. Y.

Read before the Second District Dental Society, Feb. 8, 1904.

The first statement that as a principle in law and in equity, by reason of his graduation pledge, the surgeon is under obligation to use every precaution lest he communicate disease "unknowing that such is possible," is to be found in one of Orfila's letters. Long before the modern notions of the causes of disease were developed or were dreamed of, some men were convinced of the absolute necessity of a cleanliness beyond the imagination of their age, and while they neither formed nor developed even the possibility of forming any of the modern theories, they most certainly recognized a large proportion of the facts on which these modern theories are built.

Ancient Knowledge of Infection.

It is three centuries and a half and a little more since a Dutchman wrote a remarkable statement which may be rendered from his Latin thus, "It is well known that a wound made by a bright and clean sword will heal at once, and often without a scar, and also that by a weapon (knife, or other implement of steel, Latin, *ferro*) which has been thrust into a piece of tainted meat a wound is given, which may indeed seem to heal, but surely the wounded man will die, before any long time, slain by that same wound." This reference seems to show that the proper value of cleanliness was seen before 1872.

A particular case is mentioned by Orfila as one in which, as he believed, the evidence amounted to a demonstration that cystitis was conveyed by a catheter and another in which the disease called euphemistically "the foreign plague," meaning syphilis, was conveyed by a surgeon who used this same instrument in ways careless and unclean and he adds, "there were no primary lesions," to translate into modern phrase. Record also mentions unclean probes as means by which syphilis may be conveyed without the fault or the knowledge of the innocent, but victimized, patient, and I am quite sure that not one of you would hesitate to say that cases are not exactly infrequent in which this dreadful plague has been conveyed from patient to dentist by chance injuries. I am quite sure that some of the older men, and it may be some yet younger, have known of cases in which this disease has been conveyed from one patient to another by the careless use of unclean instruments. None of the recorded cases are recent, for to their credit be it said, the dentists accepted the gospel of cleanliness long before the medical men did, and also practiced its teachings. It is my firm belief

that the Dawson case was the last one in which such culpable neglect was proved against a properly instructed man, by which "properly," is intended one who has been instructed in the teachings of the hour, and in this famous case there was much to make one doubt the justice of the verdict. However, if the evidence brought forward was true, the dentist was certainly very careless, yes, culpably so; he certainly did not use "due and reasonable care," as the judge said. The defendant admitted that he had used the broach "just once" before, and the second time was seemingly upon the patient to whom the disease was given. It was admitted that the dentist did not know that the first case was a syphilitic, but after the proof, an unquestionable eruption appeared in the second case, the man on whom the broach was first used was hunted up, and it was shown beyond a doubt, yes, by his own admission, that this person was a syphilitic in the tertiary stage, and he knew it. Mucus patches were present in the mouth, and how the dentist could have mistaken them for anything other than themselves, no man could understand. It is safe to say that many men since 1882 have disinfected instruments which were to be used in root canals under the impulse given by this case, not one of whom had ever so much as heard of it.

My interest in the question whose proper answer I have been trying to determine, the possible infection by means of a contaminated instrument, supposedly clean, was occasioned by some successful attempts to produce deep abscesses by needle punctures which I made many years ago, when the question was still rationally debated. It shows how recent is the origin of our present cultus that a man not yet fifty can make such a statement, nevertheless it is true. Even as late as 1888 there were surgeons of world-wide repute who would not believe that this elementary fact was a fact, and it is not without interest to mention the incident which converted one of them to a belief in the modern theories. A number of us were dining together and somehow the question came up and this man said, most unwisely, that he would give one hundred guineas to a certain laboratory if the demonstration could be made under the conditions which he considered would be proof. It is quite needless to say that the laboratory in due time received the promised check.

The study to which reference was made, in your **The Author's Investigations.** secretary's note to me, has been in a way a failure, and in a way a success. A failure because Dr. Ottolengui and I in some way worked at cross purposes; a complete success, however, in proving that unless the instruments, the fine probes, are carefully sterilized by the man who uses them he cannot be sure that they are really clean.





In regard to the cultures which I made from the small steel probes which were sent to me by the gentleman just mentioned, I think enough will be said if I put the facts thus: "From some I obtained cultures which were those which he anticipated; from some I obtained cultures which he did not anticipate; from some I failed in obtaining cultures which he did anticipate." I was disappointed in the way in which the matter was developed, and I think he was, but I do not feel justified in stating my results more at length, but having been begun, the investigation was allowed to drop so far as our work in common was concerned. Later I was able to continue it in another way, although not in the way in which I had at first expected.

**The
Filth Bacillus.**

It is of course a matter of universal knowledge that by regulating the temperature one can, in a way, condition the cultures so that a group will grow luxuriantly, while another group will be hindered in development, and in other ways selections can be made from a much mixed culture-material. For this reason it is a custom to culture every inquirerendum on various media and at as many temperatures as possible. This of course I did, and I am quite sure that it was the result of a series of parallel cultures which caused the break in the study already spoken of. There is a figured element, a filth bacillus, as widespread as man, and it may be wider, which finds its home upon the skin. It seems to make no difference how hard we try, we cannot free our bodies to microscopic cleanliness from this pestilent vegetal invader of the personal rights of the individual, and as few people really try to get their hands clean, and a still smaller number succeed, even when they congratulate themselves on their success, cultures of this bacillus or bacterium, it is not certain which, can be easily gotten from nearly every human hand, if from nowhere beside then from the web between the fingers. I have many times "carefully cleaned" my hands and then have obtained cultures easily. In fact one may say that wherever there is a gland which secretes the oil which preserves the skin, there is a culture of this so persistent plague, ready if it has time to convert the oil of the skin into the stinking fatty acid which is known and abhorred by all. In the tubes which were at the proper température in one of the cultures which were made from the instrument sent to me, I found this figured element growing luxuriantly. I was greatly surprised and a good deal puzzled. I had taken the utmost care in handling, and I was sure then and I am just as certain now that it was on the instrument at the time it came into my charge. I wrote to, or called on Dr. Ottolengui, I think that I wrote, and asked him if he could by any chance have touched that broach, and stated my reasons for the asking. You will all see at once the bearing; the tubes in which the broaches were sent to me, I knew



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to be sterile. I presumed that the doctor had sterilized the broaches before using, incidentally by heating them to draw the temper as I had seen Dr. Barker do, and therefore there were only two sources of contamination left, his fingers or his patient's mouth. He replied that he had not touched the broach and he insisted to me that he had touched nothing but the tooth, and that he "knew," this word was "the rock which wrecked my Good-Intent," that "the cavity was sterile." I had called on him to get an explanation of the circumstances which was perplexing to me, and metaphorically speaking, that "I know" made the explanation utterly impossible.

At that time I did not know, as I now do, that this same figured element is the cause of the fetid odor which taints the breath of so many people with the perfume which no one likes, finding nidus in fat about the teeth which has I know not what origin. Had I known this at the time, I should simply have concluded that the dentist was mistaken in thinking that he had "cleaned the tooth" and that this was the source of contamination, but as matters stood we had reached an *impasse*. I tried to explain the difficulty, but unsuccessfully, and I still think that our friend fancied that I was making a reflection on the toilet of his hands.

Since then this same figured element has been found under circumstances which show that it can, and does, grow in the cavities in some teeth and on the surface in other cases, but I am sure it cannot be gotten in a culturable condition in a properly sterilized cavity. After this unfortunate interview the investigation languished and died so far as the original study was concerned, but I obtained a number of new broaches and tested them all, and I can assure you, gentlemen, that if you do not as by rule and routine sterilize every one which you use, you are most certainly running the chance of doing infinite harm.

Later I was so fortunate as to obtain some half-dozen broaches from another dentist, and I understand that he intends to use the material with which I furnished him for an extended discussion. It is enough to say that from the evidence which I was able to bring forward he was convinced that it was the part of wisdom to carefully sterilize every broach before it is used and if in doubt to do it twice. Results showed that it was possible to inoculate culture gelatine one hundred hours after the instrument was contaminated.

Taking the results of all my cultures, the new broaches were the most dangerous; the others were sufficiently so, but the new ones showed not only filth bacilli of half a dozen sorts, all of which are believed to be able to set up inflammatory action, but also the yellow suppuration coccus. More than once since I made the study I have wondered if the dentist may not be measurably to blame for some abscesses at the apices of the roots of teeth and some other things also.





ITEMS OF INTEREST

The figured elements which I have identified as
Germs Found. being found in the cavities explored by these instruments are:

Bacillus Saprogenes 1. Rosenbach.
Bacillus Saprogenes 2. " "
Blondi's Streptococcus. } Has been found four times, or one not distinguishable has been confused with it.

A form very like to hoefflus bacillus, probably was the same.

Bacillus Pyocyanous.

Bacillus Tuberculosis (from sordes like material at the edge of the gums).

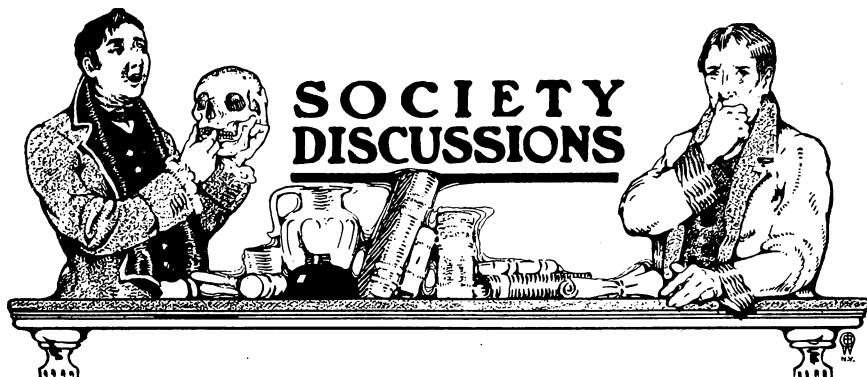
Staphylococcus pyogenes aureus.

Staphylococcus salivarius pyogenes. (?) "A man with about twenty loose and inflamed teeth." (Dentist's account).

Becker's coccus (from an old gumboil discharging from a tooth).

In all eight with tolerable surety, one identification is doubtful, but beyond all doubt were the study pursued systematically very much might be learned. What is needed is a systematic study on identification of all the figured elements found in root canals. Specially is study needed in respect to those abscesses which seem to have no opening, yet which fill the whole of the pulp cavity. Much can be learned by systematic work on the lines sketched, but it cannot be done single handed nor can results be reached without time and trouble and money. Given this trinity and one is justified in expecting much.





SOCIETY DISCUSSIONS

Institute of Dental Pedagogics.

Discussion of Dr. Ambler's Paper.

Dr. C. McManus, that I feel that I can add very little of value to the **Hartford, Conn.** discussion of this interesting subject. It is certainly gratifying that a body of teachers should consider it

of sufficient importance to give it their attention at this time, when our colleges are about to begin a four years' course, and the former valid excuse of lack of time for its proper consideration can hold good no longer.

In the four years which the future dental students will spend in getting their professional training there is certainly ample time for what Dr. Ambler has conservatively termed "a *reasonable* course of instruction." It is not necessary that every dental college should have its "Professor of Dental History and Literature," nor that an exhaustive series of lectures should be given on these subjects, but I feel that the college of the future will not be doing its full duty, if it continues to entirely neglect such a means of broadening the professional character of its students.

Dentistry is not alone in the neglect of the study and teaching of its history—we stand side by side with medicine in that respect. Over thirty years ago Duglison speaks of students being "left to gather their information on the previous state of medicine in whatever manner they may find it practicable or convenient to do so after graduation."

Twenty-five years later Dr. Roswell Park, of Buffalo, writes: "The history of medicine has been sadly neglected in our medical schools." Thirty years ago the great Virchow wrote "that the scientific knowledge of young physicians reaches only three to five years back."

Braatz says that "the history of medicine was taught as a regular branch in fifteen German-speaking universities many years ago, but it is





kept up now in only one or two. Nevertheless," he says "the medical graduate needs the story of the past in order to appreciate the present, to uphold the traditions in professional ethics and for many other reasons," and he pleads "that this instruction should not be neglected."

Duglison's "History of Medicine" was the outcome of a series of lectures delivered many years ago before the students of the University of Virginia and Park's volume was the result of an attempt to give systematic instruction to the classes at the University of Buffalo. Dr. Park says that it is a source of the greatest satisfaction to him that his sincere hope has been fulfilled, in that the profession generally are now manifesting a deep interest in this important subject. I simply state these points as an evidence, that not only in past neglect, but in present interest, we are closely in touch with our old friends of the medical profession, not only in this country, but in Europe.

Properly presented to the student, the history of the profession and its literature, has a very *practical* as well as an ethical value.

Dr. Black struck the keynote of the whole matter when he said that "a history of dentistry should be, not a history of men but a history of *the progress of thought in dentistry*."

Carrying out this idea the students could be guided, by the teachers, in their reading and sent to the college library, and museum, to follow up, through the old books and journals, and by the study of the instruments and appliances of former days, the development of modern dentistry. It could not fail to interest them as they would come upon so many old ideas that would seem to them so new—and be made to realize that some of our modern devices are so old.

In this way—a sort of laboratory method of studying history and literature—they would be getting their information in the "original package" and would not be in so much danger of "knowing so many things that ain't so"—to quote that eminent philosopher, Josh Billings.

Dr. Ambler has said, "If you impress the minds of students with history they will have a higher regard for the status and dignity of their calling."

It is here that a proper consideration of dental biography may have its lasting ethical value in forming true professional character.

Dr. S. G. Perry has beautifully said: "I am impressed with the thought that we have a great deal to be thankful for in being members of a profession that can make such an array of names of men who could grace any calling on this earth at any time and it is proper that we should stop to historically consider these men, and that we should occasionally lay aside scientific questions to think of these things that really touch the heart so deeply."



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It is this practical and ethical value of instruction in our history and literature that makes it worthy of the attention of all having a true interest in dental education at heart.

The dentist who is ignorant of the beginning of
Dr. B. J. Cigrand, his profession and is not familiar with the trials of
Chicago, Ill. the early forefathers is not unlike the patriot who

glories in the triumphs and achievements of his native land, but knows nothing of the making of the established institutions he so blindly loves. The dental student who acquires a knowledge of the evolution of his prospective profession, will be more likely to cherish more dearly the heritage bequeathed by the giant minds who laid its broad foundation. In fact, if the students were required to study the biographies of the founders of our calling they would recognize the merit of self sacrifice and devotion of the pioneers and would more keenly appreciate the honor of the conference of the degree of Doctor of Dental Surgery. If the students understand the heroic efforts made by men like Hayden, Harris, Hudson, Gardette, Randall, Wells, Townsend and Wescott, and study the careers of such distinguished educators as McQuillen, Cushing Garretson, Allport, McKellops, Taft and Barrett, they would scorn the fellow classmate who would dare to violate the code of ethics and despise him who aims to commercialize every feature in the noble purpose of our vocation. The study of the biographies of even such of the living as Black, Williams, Miller and Marshall would contribute liberally towards establishing in the minds of the students a sense of reverence and respect. I quite agree with the famous Englishman who said that "the history of any nation is but one of biography of its great men." It is equally applicable to the history of a profession, and for this reason I have during the past eight years given a special course of lectures on the biographies of the individuals who have laid the basic structures of the science and art of dentistry. Besides the course includes a clear résumé of the origin, development and present standing of the various dental bodies, thus familiarizing the students with the purpose of the dental societies and associations, and emphasizing the importance of identifying themselves with dental societies calculated to broaden their knowledge of dental procedures, and assisting in the great work of constructive gatherings.

I believe it was Lord Bacon who said, "Every man is a debtor to his profession," and he certainly was correct, hence let us contribute our quota to the great cause and a certain method, promissory or begetting love of profession can be found in the study of the history of our profession. Through this channel we can improve the minds of our student body and inculcate a desire to emulate those who have so cheerfully toiled to make ours a dignified calling.





J. H. Kennerly,
M.D., D.D.S.,
St. Louis, Mo.

Goethe, in his fundamental work on education entitled "Wilhelm Meister," expresses the thought that to understand one's profession thoroughly it is necessary to know its history. The very significance of this aphorism is self-evident. The struggles

and strifes of the forefathers of our profession for the development of the unknown factors which govern the routine work of a successful dental practice are not alone interesting from an historical point of view, but by their study we give to our own mind and that of our students' the power of cultivating logical reasoning. The inventions and discoveries of the various appliances of our armamentarium are of immense benefit for the rapid execution of our daily work, and a knowledge of the various steps which were instrumental in bringing them to the present point of perfection is of still more importance, as it will prevent the so-called discovery of methods, which have been cast aside, and on the other hand, form a solid guide-post for the progress and development of procedures which are still in their infancy. Further, if a closer acquaintance with these facts were generally to be found amongst the profession, many of the costly lawsuits involving new fangled ideas in regard to the construction of a certain crown or bridge, could be quickly and successfully averted by simply referring to historical data obtained from existing literature. The celebrated lawsuit Allen *vs.* Hunter (Continuous Gum) and the Goodyear vulcanite case, will be remembered by many of those present. On the other hand, by the study of the history of a profession, a discovery, invention, or the performance of a certain operative method, is more certain to be credited to its rightful originator. To illustrate this particular point more fully let me cite to you the following interesting bit of history:

**Work
of Early Dentists.**

In 1851 Dr. S. P. Hullihan introduced an operation which in dental history is known as Hullihan's operation "Rhizodontypy." It consists "in making a hole through the gum, the outer edge of the alveolar process and the root of the tooth into the nerve cavity and then in opening the blood vessel of the nerve." While this operation had been already practised by Hunter and Fox, a closer study of the works of the Latin medical writers reveals the fact that Archigenes, who lived about the year of 100, used "a small trephine to drill into the middle of the tooth to relieve the pain" from a dead pulp. The same operation was much lauded by Pliny, the older, who, however, to obviate the pain arising therefrom, advocated the use of a local anesthetic, the "*lapis memphiticus*," a stone somewhat similar to onyx which was powdered and mixed with vinegar and then spread over the affected part. Again, the question when and by

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whom were the first gold fillings placed in teeth, is extremely interesting from an historical point of view.

In one of the later American works on dental history, the following statement is found: "One of the mummified bodies of an Egyptian Pharaoh demonstrates most conclusively that natural teeth were not only well cared for in the way of gold and lead filling," etc., quoting as an authority the *Papyrus Ebers*. As a matter of historical fact we would like to state in Joachim's authorized translation of the Egyptian Hieroglyphics of the *Papyrus Ebers*, no such statement can be found. On the contrary, the late Professor Ebers writes in a private letter in 1895 to Dr. Jacobi, of Frankfort, as follows: "In spite of the minutest investigations in regard to the filling of teeth in the mummies of Egypt, I can only record negative results." The celebrated craniologist, Professor Emil Schmidt, of Leipzig, who possesses several hundred crania of mummies, adds to it thus: "In no one denture did I find anything that could be traced to the work of a dentist—no filling, no filing nor preparation of a carious defect; no artificial dentures." In 1728, Fauchard published the first edition of his work, *The Dental Surgeon*, and he is the first authentic author who gives a definite description of filling teeth with metals, employing tin, lead and gold. However, gold fillings are mentioned long before this work of Fauchard appeared, e.g., in the writings of the two Italians, Vigo and Arculanus. Giovanni da Vigo, the Genoese (1460-1520), was connected with the medical school in Padua. He writes quite at length about the extraction of teeth, being bitterly opposed to the performance of this surgical operation "*In publico banco vagabundis charlatanis*." He advises the use of arsenic and sublimate for the treatment of old fistulous openings, and merely mentions the possibility of filling a tooth with leaves of gold. Da Vigo's work appeared in Latin in 1514; an English translation of this surgery was published in London in the year 1550. Giovanni d'Arvoli, or as he styled himself according to the uses of learned men of his time, "Johannas Arculanus," was a professor of medicine in Bologna, dying in 1484.

**The Teaching
of Dental History.** The teaching of dental and medical history in the colleges and universities is still in its infancy.

While there is in some European universities a special chair of medical history, as for instance in the University of Berlin, the United States has been rather slow in recognizing this important subject. The University of Maryland is at present the first and only institution which has a regular professorship of medical history incorporated in its faculty. As we are informed, Dr. McManus, of Hartford, Conn., has delivered a series of lectures relative to dental history to the last year's class of his Alma Mater, the Pennsylvania Col-





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lege of Dental Surgery. Dr. B. J. Cigrand also fills a chair on this subject in the Dental School of the University of Illinois. These are probably the only three known courses of lectures on dental or medical history in the United States. In the other schools, the various professors usually refer to the history of their relative subjects in an introductory lecture, or during the progress of the course. Concerning the literature of this extremely interesting subject let me say just a few words. As far as I am informed there are only two works in the English language which teach dental history and they do so in a somewhat hasty manner. The first and most important is the history of dental and oral science in America published by authority of the American Academy of Dental Science in 1876; the other, entitled "The Rise, Fall and Revival of Dental Prosthesis," by Dr. B. J. Cigrand, of Chicago, Ill. There are still others which might be mentioned, namely, "History of Medicine," by Parks, and the English translation of the German work of Herman Peters entitled "Pictorial History of Ancient Pharmacy," and the "History of Medicine." All are extremely valuable. Dr. Jacobi, of Frankfort, Germany, has published a little work entitled "History of Dentistry," a very interesting book of great value, although somewhat limited in its scope. There is another work published in the French language, which, while of value, deals primarily with dental history in France. As a guide to the literature, the late lamented Dr. Taft, who was primarily selected to read a paper before this body, has compiled an index to the periodical literature of dental science and art as presented in the English language and "Sternfeld's" dental index are very useful and important works. Dr. McManus has published important personal sketches of the forefathers of our profession. Dr. A. H. Fuller has also published an interesting paper on the same subject. Dr. Wm. Trueman, of Philadelphia, has contributed largely to the general dental history in the various journals, and a series of personal sketches of the older men of our profession has appeared in the dental review by Dr. B. L. Thorpe. The older dental journals and text books furnish an abundance of valuable information, and it is to be hoped that some of our able men like Drs. McManus and Trueman will in the near future furnish us with a more complete history of the dental profession.

**Dr. Burton Lee
Thorpe,
St. Louis, Mo.**

Until within the past few years our profession has paid little attention to its early history. I doubt if any other profession has as meager knowledge of its origin as ours.

In our college we consider dental history an important branch. In my course on this subject I begin with a review of the subjects appertaining to mention of dental operations B. C., follow-

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ing with a review of the theories and methods advanced by Fauchard, Chemant, Celus, and John Hunter, who enters at some length into details of tooth development, theories on caries, inflammation of tooth tissue, and suggestion on treatment.

Le Merle's "*Histoire de l'Art*," and G. P. Geist-Jacobi "*Geschichte der Zahn-hul-Kunde*" works are worth reviewing; also the works of Joseph Fox, Alex Nasmyth, John Bell, Leonard Koecker, Duval, S. Fitch and John Tomes' Lectures of 1848. Chapin A. Harris, while editor of the *American Journal of Dental Science*, contributed many articles of historic and scientific value to that journal and did future teachers a great benefit when he translated and published in his journal the works of Baume—"Treatise on First Dentition." Garrot—"Diseases of the Mouth." Jobson—"Treatise on the Anatomy and Physiology of the Teeth." Lefoulon—"Theory and Practice of Dental Surgery." Delabarre—"Second Dentition." Blandin—"Human and Comparative Anatomy of the Dental System." Desirabode—"Elements of the Science and Art of the Dentist." Jourdain—"Diseases and Surgical Operations of the Mouth." Besides valuable treatises such as Berdmore, "*Tréatise on Disorders and Deformities of the Teeth and Gums*." J. Waits, "*Facts Connected with the Teeth*." Blake, "*Structure and Formation of the Teeth connected with the Teeth*." Blake, "*Structure and Formation of the Teeth in Man and Animals*," and T. E. Bond's "*Practical Treatise on Dental Medicine*," all of which give interesting points for a course on history. To briefly review the various theories and modes of treatment of these authors, to briefly take up individually, from a biographical standpoint, the characteristics, theories, methods, inventions, literary contributions and professional attainments of the many good men who helped to build our profession's superstructure, and who are the real makers of dentistry is of more than passing interest. These lectures are made more interesting by illustrating with lantern slides.

The three most potent factors in our profession's history, from an educational standpoint, are the college, the journal and the society. The origin and work accomplished by each should be reviewed. The early volumes of the *American Journal of Dental Science*, *Dental Register of the West*, and *Dental News Letter*, and other of the early journals will give much information of interest. The committee on history for the Fourth International Dental Congress are attempting a work which, when completed, will add much to dental history, viz.: the gathering of data making a complete report of the organization and work accomplished by each dental college in the United States.

Each college should furnish, as soon as requested by the committee, a brief, concise account of all historic data connected with the organization





and following events of interest. Someone has said: "Who knows not another language cannot understand his own." To properly appreciate just what we are we must first realize what we were. The National Dental Association, Committee on History, has done much in the past few years in exciting interest in this very important subject and deserves financial aid to successfully carry on and complete this work. The history of dentistry cannot be written in a day or by one man. The systematic co-operation of all who are concerned in historical matters is needed, that, by united effort we may rescue from oblivion many important facts that, when properly compiled, will give us an *absolutely authentic history*.

The efforts, along this line, of Wm. H. Trueman, Jonathan Taft, B. J. Cigrand and Chas. McManus deserve especial commendation.

Now that we have a four-year course and plenty of time to teach this subject there is no reason why a chair on dental history and literature should not be taught in all colleges. To know and appreciate the events of our infancy and growth and the attainments of the men who are a composite of dental patriot, pioneer and pathfinder is both instructive and of lasting benefit to the student.

This is a subject in which I am deeply interested,

Dr. G. U. Black, and I would like to see it pursued more closely in
Chicago, Ill. the future than it has been in the past. We have a

great deal to do in the searching out and tabulation of data on this subject. We seem to have lost sight of the literature of the past, and our students know little or nothing of this literature. In our present college course we have not the time to give them a proper résumé of the subject. There are many things that could be given to the student with reference to dental history that would be of interest. For instance, the oldest data I could find with reference to gold filling was in a German book, published about 1530. The author seemed to understand the filling of teeth with gold and he quoted from others who wrote considerably before his time. This, so far as I know, is the oldest printed record of this operation.

I am sure that with proper search and going over of old books we may go still further back and find data of great importance to an understanding of the development of thought upon this subject. For after all, while the history of man is important and interesting, the great point is to arrive at the development of thought along these lines.

I have been very much pleased with this paper.

Dr. R. H. Hofheinz, I always feel sorry that I can give my students but
Rochester, N. Y. a short history of dentistry owing to lack of time. I believe that there is no one thing that will stimulate the ethical feeling of the student so much as this matter of dental history.

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As one speaker remarked: "What does patriotism depend upon?" It depends largely upon the history of the nation. It depends largely upon the reading of and knowledge of that history by the people. It is exactly the same in dentistry. If our students lack that patriotism for dentistry, which they must get largely through this learning of history, they are lacking one of the most essential points necessary to success. Dr. Patterson, in his paper at the beginning of this session, spoke of the lack of ethics in schools. I do not believe that there is any other subject that will produce better ethics than the teaching of dental history.

I do not agree with Dr. Thorpe that history should be taught exclusively in the fourth year, because the sooner you develop this feeling of reverence for our science the better you apply the teaching of history. I believe dental history should be taught to the freshman classes because at that time they need as much ethical training as ever afterwards. It will bear repetition in the senior year. It should be made more interesting by biographical sketches because these are entertaining, but when the course is repeated in the fourth year the biography should be secondary.

I am very sorry to know that so little history is taught in our dental schools, and also that the German universities have given up the teaching of the history of medicine. Of course, there is some difference. The history of medicine is well established. It has been taught for centuries. But dentistry is too new to have a well established history. Such men as Trueman, Black, Willmott and others should contribute to history by writing their biographies, so as to stimulate the coming generations in their admiration for what has gone before them.

Dr. Hofheinz misunderstood me. I did not intend to say that dental history should be taught only

in the fourth year. I said that now that we have the four-year course there was no excuse if we do not find time to teach dental history. Another point I omitted was the use of the lantern slides showing the various appliances used in the past, and also photographs of the pioneers in dentistry.

Dr. J. B. Willmott, Toronto, Can. I wish to give expression to two thoughts with reference to the history of dentistry. I heard no mention made of a work entitled "*History of Dental and Oral Science in America*," published as part of the

Centennial celebration of 1876, edited by James E. Dexter, of New York, and published by the S. S. White Dental Manufacturing Co. I purchased a copy of it and was delighted with it. In the absence of a systematized course on history this work furnished the teacher of operative and prosthetic dentistry with much information as to the development of practical dentistry.





One matter of special interest is the history of the "amalgam war." It greatly helps the student to understand the proper position of amalgam as a therapeutic agent.

Another point I wanted to make: The authorities of the corporate body of dentists of the Province of Ontario have sent out circulars to all men in practice previous to 1870, asking them to furnish a biographical sketch of themselves; the kind of instruction they received in dentistry, and the conditions under which they entered upon the study and practice of dentistry; giving some idea of the practice of dentistry as carried on at that time. We received responses from about thirty undertaking to furnish us with information. I think these thirty papers will give us a fair basis on which to start a history of dentistry in our Province.

I want to say another word about the tabulation

Dr. G. U. Black. of data. About four years ago, acting on my advice as a means of studying dental literature, my son, Arthur, set about making a card catalogue of dental literature. He has run well up into the last century and has some thirty thousand cards of this catalogue completed, thus furnishing us with a ready means for looking back upon any point in the history of the profession. This should be done not only by one man but by hundreds of men, and it has been a question in my mind whether we could organize a system of card cataloging that would take in, perhaps, as many as have considerable libraries, or as many as read carefully and closely and are interested in the subject. There could then be an interchange of cards. We would get at exact data, and in a form in which they could be transmitted and yet be of very little expense to anyone. I throw this out as a possibility of the future, and I hope that some of you will take it up.

In the University of Southern California we have

Dr. W. S. Bebb, had a chair of literature and ethics for three years.

Los Angeles, Cal. I believe that the influence of this work is felt, from the fact that in our district out of 170 eligible members to a dental society, 140 belong to the Southern Californian.

Some years ago, in connection with our college

Dr. Willmott. library, we undertook to get up a card index of five of the leading dental journals. We commenced from the date of Dr. Taft's index and indexed the five journals very minutely so that we can refer to any writer or subject that has been discussed during these years. I shall be very happy to extend the courtesies of our library to any member of this association.

I wish to correct two or three statements

Dr. Ambler. made by those who discussed my paper. One gentleman said that the first time that dental history was

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taught was about three years ago. That is a mistake. The first teacher and the first college to teach dental history are located in Chicago. Dr. B. J. Cigrand first began to teach dental history about nine years ago. He is the pioneer.

Another statement was made that there are only three colleges that taught dental history. I have a list appended to my paper of seven schools that teach this subject, and I feel confident that this does not include them all because I did not have all the catalogues of the dental schools of this country.

I fear that I have written rather a tame paper because no one has found any fault with it, yet I feel grateful for what was said because I have learned much from the discussion.

Discussion of Dr. H. J. Goslee's Paper.*

I wish to congratulate Dr. Goslee on this excellent paper. It seems quite fitting that the first paper on Porcelain Technology, before this body, should come from a Chicago teacher, and I know of no better one to present this subject than Dr. Goslee.

The two principal points to keep in mind in teaching porcelain work are, first, how can the student be taught to successfully master this art; and second, how can he be taught to appreciate work of this character so that he will not be injudicious in its application. Dr. Goslee has given an outline for the first, which if followed, will make a very thorough course of instruction.

It is reasonable to presume that certain classes of porcelain work will be indiscriminately and injudiciously employed to as great an extent as bridge-work. So every teacher should guard against this as much as possible by not appearing ultra-enthusiastic in this particular branch. While every phase of this subject should be taught, it should be done in such a manner that the student will be impressed with the necessity of being conservative in the application of porcelain.

A complete course in porcelain technology, not only gives the student a thorough knowledge of porcelain and its application, but assists in developing the artistic and esthetic qualities of his nature. Porcelain technology should be taught in the senior year, but anything tending to

*Dr. Goslee's paper was published in the February issue.—EDITOR.





develop the artistic sense of the student should be given in the preceding years; carving teeth from ivory blocks, moulding and modeling in plastic materials and carving cusps to be used as patterns for constructing dies in crown and bridge work and adjuncts to porcelain technology.

I require the students of the college in which I have the honor to teach to carve six teeth from ivory blocks, model sixteen teeth in potter's clay and carve model cusps for all crowns in modeling composition or plaster of paris. This helps them to remember tooth forms so when they begin their porcelain technic they have retained some (at least one or two points) of their dental anatomy.

I agree with Dr. Goslee in that the didactic instruction should precede the technic. The course should be so graded that a technic operation will follow soon after each lecture. It is a mistake to allow the student to perform his technic operations in advance of his didactic instruction, for he never thoroughly appreciates what he is doing.

Our students are given a preliminary course similar to the one outlined by the essayist, section II first, second and third steps, which involves the moulding, the cutting of cavities, and the baking of the large tooth. The essayist says, "Upon the completion of the above requirements (referring to inlay technic) the work should become still further advanced so as to include crown and bridge work next in order." I believe the crown and bridge technic should precede the inlay because the student increases his knowledge and in manipulating porcelains, he also learns to gauge for shrinkage and obtains better results with colors, all of which will assist him in his course in inlay work, which includes the most delicate operations in porcelain technology.

If courses of instruction, both didactic and in technic, similar to that outlined by the essayist are followed, the students of today will graduate with a broader knowledge of porcelain and with greater manipulative skill than those who have preceded them. So I can only commend the outline in its entirety.

I regret that Dr. Goslee did not tell us how he teaches his students to obtain proper shades of colors, for this is the hardest part of the operation in practice. I believe the teachers of porcelain work and of physics should work together, and give the students a more thorough course on light and colors.

In conclusion I wish to thank Dr. Goslee for this excellent paper and to say that we as teachers of dental art should give the subject of porcelain a great deal of consideration and arrange our curriculum so that the students will receive full benefit of a thorough course of instruction on porcelain in all its phases.



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If the essayist started out with the idea of showing the value of method and system in teaching, aside from suggesting a valuable outline for the teaching of this subject, then in my opinion he has succeeded.

Dr. H. L. Banzhaf,
Milwaukee, Wis.
It seems to me that the very first question a teacher should ask himself in teaching porcelain technology is—what is the student prepared for, and second, what, of that which he is prepared for, and which he is to do in technic, does he need next.

That the teacher shall be able to answer these questions, and answer them *correctly*, is imperative, if a fundamental principle in good teaching is to be observed.

The first question relates to the importance of knowing how much didactic instruction upon this specific subject has been absorbed by the student, before technic work shall be undertaken at all. It is hard to imagine how good results *can* obtain, when this instruction does not precede, or at the very least, is carried on simultaneously with technic work.

The second question suggests the importance of aim in teaching. I take it that no one will question this truth, that without a definite purpose in the teacher's mind, there can be no definite assignment of work to be done by the student; and that without this knowing in advance what is to follow, the teacher's work must necessarily be vague and unrelated. No one, of course, will deny that a broad general purpose in the teaching of the entire subject is essential, and conceding this, it still remains true, that the specific purpose must always be to acquire knowledge and skill in a certain clearly outlined direction, in order to accomplish good results without waste of time and energy.

We, as teachers, in teaching any subject, should have our aim sufficiently definite so that it can be stated. If we cannot do that, then there is something wrong, and unless we know our "Course" we ought in all charity to bear with the student who fails in the performance.

We must continually have in mind the things which must be known or done, in order that the purpose may be realized.

The necessity for order in teaching has been forcibly brought out by Dr. Goslee. The general order as laid down by him can scarcely be criticised; but working out the detail must always remain as one of a teacher's prerogatives. Aim and order must be observed, but every teacher has the right to exercise personal freedom or even caprice in teaching. The moment a teacher permits *himself* to be reduced to an automaton, that moment he loses his individuality, and his personal influence over the student, both of which are fatal.

If a teacher knows his subject, has looked at it from every point of





view, has in his preparation thought out the order in which the student is to do this work, then he is the kind of teacher who is able to cope with emergencies as they arise. We know that these conditions do arise, and here it is where the personality of the teacher becomes a vital factor, in fact means success or failure to the student. These are things which can scarcely be described, and must be "to the manor born."

They are facts based on well-established psychological principles, or if you please on common sense.

The propositions as presented to us by the essayist, speak of actual experience, and breathes the breath of life into the principle, from the known to the related unknown. This carried into practice in our laboratories and lecture rooms will usually make of the student an intelligent worker, and surely of the teacher an instructor, and educator.

When two or more persons agree upon a certain

Dr. J. M. Thompson, subject there is no room for argument. Dr. Goslee's
Detroit, Mich. paper is a masterpiece, and I can only emphasize a few of the points mentioned by him.

Too much cannot be said in favor of teaching the student the names and the relative merits of the materials which are used in the manufacture of porcelain. It does not follow necessarily that the manufacture of different bodies must be taught, but a knowledge of what each ingredient may be expected to produce will lead to a more intelligent selection of materials offered for sale by the different manufacturers.

It matters very little whether inlay or crown and bridge work are taught first. The same general principles govern the manipulation of the porcelain in either line, and as far as the colors are concerned their selection rests entirely with the student. Porcelain may correctly be termed "the spotless one" in dentistry, therefore it calls for the most thoughtful and careful teaching.

I never before heard such a good discussion of

Dr. A. E. Webster, the subject of teaching, nor better principles than
Toronto, Can. those enunciated by Dr. Goslee. I have here a

model that may be used nicely for porcelain inlay work and for crowns. The student can select the shade and shape of the teeth. The teeth are made of vegetable ivory. Dr. Black suggested that we make the rubber harder than we have so that the teeth will stand in position more rigidly. This model is more rigid than we have been making them. The vegetable ivory is easily cut and yet it is quite friable. It cuts much like dentine.

It might be well, for porcelain technic purposes, to experiment with a cheaper material like iron. If bath tubs and porcelain signs can be made



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on iron, we ought to be able to make porcelain techniques for college purposes in the same way.

This is an excellent paper. It is well arranged,

Dr. J. H. Sherwood, concise and does not wander from the subject. My first instruction in porcelain technology I obtained from Dr. Goslee, and since then I have endeavored to

follow him, working out from my own experience what I could. I would like to ask Dr. Goslee how much of this work, if any of it, should be taught in the freshman year. The work outlined covers such a comprehensive scope that I do not see how all of it can be taught in the course we have now. When we come to the four year course then I can see how the work can be taught to the different classes. Personally, I am not in favor of teaching the work in the freshman year, although I think Mr. Brewster's object in getting up this outfit was that it should be used by the freshmen, but if it is to be taken into the technic course of the junior year, I do not see how we can get the time for teaching all that was outlined in the paper.

I have had some trouble in teaching crown and bridge work to find time in which to do it all, to say nothing of the technic work that belongs to porcelain. I have had to teach the technic work of that in the senior year, which I think is wrong. I have found that after getting in all the work that belongs to ordinary crown and bridge work I have no time left for teaching the technical or practical work in porcelain. There are a few students who will find time to reach that stage because of their ambition and hard work, but they are few in number. As the matter stands today our students graduate with only a limited knowledge of porcelain work. It is not right and something should be done to remedy this evil.

This is the most complete outline of a course in

Dr. W. C. Reeves, porcelain work ever presented, and it certainly will bring good results. If we cannot agree on the

Chicago. importance of porcelain work, we ought at least to express our opinions on the subject and not be afraid of it. It has come to stay and occupies a more prominent position every year, and speaking of it as "where indicated" should cease. None of you talk about where gold is indicated. It has become a fixed feature in operative dentistry. Consequently it is taught, I might say, indiscriminately. I believe that if porcelain is put on an equal footing with gold as a filling material, it will reap greater benefits for the laity than the employment of gold ever did.

There are a few things in the paper with which I differ. I believe that the student will grasp the technique of crown and bridge work in porcelain more easily than he will inlay work. By that I mean that he will





master the principles of fusing and baking porcelain more easily, and should be well grounded in this. He may get a fill of didactic work in this subject, but he will get his serviceable knowledge only from practical work and observation. He will get it in the baking of porcelain crowns. He gets a better idea of crown and bridge work in a general way than he does of porcelain inlay work.

I do not see that much benefit could be derived from teaching about the different ingredients of porcelain. Why not teach him the same thing about amalgam, or the different methods of producing the various kinds of gold? That feature of the work belongs to the manufacturer. But the student should be taught all about the different kinds of bodies; the results of baking the different bodies; their composition, form and process of manufacture. He should be well versed in the baking of four or five of the bodies before us at the present time.

I think that all of this part of the work should be taught in the junior year, previous to his going to the chair to do any operating. Then he is ready to receive the more advanced instruction in technic and in actual practical work, handling cases, etc.

I would like to ask Dr. Goslee how much time

Dr. Hall, should be devoted to the teaching of porcelain. I am
Ann Arbor, Mich. sure we are all impressed with the paper and I am
convinced that a copy of it would assist us greatly in
the formation of our curriculum of the four-year course.

This is the best paper I ever listened to with re-

Dr. R. H. Hofheinz, gard to the teaching of porcelain work; but what I
Rochester, N. Y. want to know particularly is this: How would he
discriminate, or to whom would he relegate the teach-
ing of porcelain work; the technique and history of it. To the professor
of operative dentistry or to the professor of prosthetic dentistry? We dis-
criminate between porcelain inlays and porcelain work on crowns and
bridges.

There is one point in the paper with which I do not quite agree, and that is, that it should be taught after orthodontia. I think orthodontia comprises a great deal more than porcelain work; the latter appeals particularly to the technic manual or esthetic side. Orthodontia appeals not only to this but also to the scientific side.

As to which chair shall instruct in the didactic

Dr. Goslee. portion of this course, you will remember that the
presentation of the course, as outlined, necessitates
a close interweaving of operative and prosthetic dentistry. I suggested
that the technic instruction might come either from the chair, or from a



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demonstrator. The didactic work as applied to operative dentistry should come from the professor of operative dentistry; and that portion which pertains to prosthetic dentistry should come from that chair. These two chairs should then have one instructor to give the technic instruction during the entire course. This is the manner in which the course in our school is conducted. Dr. Johnson delivers all of the lectures pertaining to the indications for porcelain fillings, cavity preparation, etc., and I take care of that portion which covers history, composition, manipulation, crown, bridge and plate work, yet we have but one demonstrator who does all of the technic work.

I said in my paper that I believed that this course should follow the technic courses in operative dentistry, prosthetic dentistry and orthodontia. It is not necessary, however, that it should follow orthodontia, but it should follow the operative and prosthetic courses.

The necessity of having this course follow ortho-

Dr. Thompson. dontia is evident, because if the student has been taught thoroughly in the movements of the teeth and separation first, it will help him greatly in inlay work.

Dr. Hofheinz. The separation of teeth comes under the domain of operative dentistry.

Dr. Sherwood. Dr. Reeves suggested something that has occasioned me considerable trouble. I would like Dr. Goslee to tell us how he manages to teach students the fusing of porcelain. We cannot allow students to handle furnaces indiscriminately, and yet there is no way to acquire that knowledge except by personal experience with the furnace.

**Dr. J. E. Nyman,
Chicago.** In my limited experience as a teacher of porcelain prosthesis I have more trouble teaching the student how to properly manipulate and fuse porcelain body than to do any other part of the work.

The training incidental to the construction of gold crowns and bridge work and gold plates is of material assistance to them in the construction of the platinum framework which is the foundation of porcelain crown and bridge work. I have very little difficulty in instructing students to do this part of the work, but in teaching the manipulation of the porcelain body I have a great deal of trouble. It is a substance the manipulation of which is entirely different from the manipulation which obtains in the handling of gold, plaster or amalgam, or any other material, and therefore I would recommend that the courses be so arranged that more work be done in the technique of the manipulation of the porcelain bodies.

In regard to instructing students how to fuse porcelain: I divide my





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classes into small sections and tell them what my experience has been in the handling of various porcelain bodies; what temperature is necessary for the fusing; and I also tell them how to handle the various makes of furnaces. I impress upon them, however, that all furnaces vary and that therefore there is a variation in the general instructions I give them. That the same thing is true of the porcelain bodies, that even the same make of body will not always fuse at the same temperature. I teach these sections how to handle the furnace and my instructions always take the side of caution so that they will take more time to fuse the porcelain than is really necessary or than they will allow later on when they have had more practice.

I wish to commend the whole paper very heartily. The subject has been presented in a scientific manner by a man who not only has acquired dexterity himself, but who also has succeeded in imparting this dexterity to others.

Allow me to preface my closing remarks by **Dr. Goslee.** thanking the society for the manner in which it has received my paper. I also desire to thank those who have discussed it for the kind words said. I should have preferred, however, to have it criticized because it is by criticism that we learn.

In the preparation of this paper—at the suggestion of the chairman of the executive committee—I hardly knew where to begin and where to end, because so far as I know, there has never before been presented anything of similar nature. I had nothing to go by, except my practical experience, and hence, the paper is based entirely upon it.

In his discussion Dr. Byram said that crown and bridge work should precede inlay work in the technic course. Dr. Reeves and Dr. Sherwood were, I believe, also of the same opinion. That is, after all, only a matter of opinion, and I do not know that it is very important in any event. It is my own opinion, however, that inlay work should always precede crown and bridge work because it is more simple in its application. You can learn to manipulate and control a small amount of material quicker than you can a large amount, and you can learn to make the matrix for a cavity quicker than you can learn the requirements of metal construction for crown and bridge work.

We should begin at the bottom, thus taking up inlay work first because of its simplicity, but if you can do better by teaching first crown and bridge work, you ought to begin that way, and yet I believe that my students have profited by beginning with inlay work.

Dr. Byram also said something with reference to teaching students how to obtain the proper colors. You will agree with me in that the



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color proposition in porcelain work is the hardest thing in connection therewith, and I am sure that Dr. Reeves has found it more difficult of mastery than any other problem in connection with this work. There are, doubtless, some students who never can learn to match colors. An eye for color is required, and such an eye is something that not everyone possesses. I believe that we can impart instruction in this by requiring students to put fillings in porcelain teeth in the technic course. For this purpose I have added to this arrangement of the subject the filling of two cavities in porcelain teeth, and as the colors must be matched as closely as possible, it may necessitate the making of several inlays before the desired color is obtained, but this work can, perhaps, best be taught out of the mouth and not in the mouth.

Next to the problem of color is the problem of

Fusing Porcelain. fusing. This is one of the most difficult things to teach, but I have not experienced the difficulty mentioned by Dr. Nyman, probably because I go at it differently. He says that all furnaces vary; and that the sources of heat production also vary, which we all know to be true. Hence, it is practically impossible to teach the fusing of porcelain by any *test*. If the sources of heat production, and all of the "bodies" vary, as Dr. Nyman said—and I believe the latter is also true—then it is almost impossible to have any accurate test for the fusing of porcelain.

I am very much interested in this matter because I have pursued different lines in teaching, as well as in practice. I believe that if you will follow this course you can teach anybody to fuse correctly: First of all, learn to do it yourself and then you can teach others, and fuse it by the eye. How do they melt steel? Not by tests. The color of the heat is what they go by. Take the flat surface of a central incisor facing, for instance, and build up a little mound of porcelain on it. Put this into the furnace and watch the fusing until the porcelain has assumed the color of the facing. Porcelain "body," as soon as it is dry, is white, and all you have to do is to watch it more or less closely until the white mass begins to change color, which represents the beginning of vitrification. Then watch it more closely until it is as smooth as the porcelain facing on which it rests. Anyone can learn this, and Dr. Seamons, who is present, will bear me out I think, because it is only recently that I have been able to teach him to fuse porcelain in this way. By beginning with the gold test students may possibly learn quicker because they will not have to observe anything up to the point of the fusion of the gold. Fusing porcelain is altogether a matter of experience, and such knowledge cannot be acquired in the first few days of the course. Watching a furnace heated to such an intense degree of heat, as is required to fuse porcelain, is claimed to be





injurious to the eyes, but I have been doing it for years, and have never worn glasses, nor have I had any trouble with my eyes. It is not necessary to get close to the furnace and you need not hesitate to open the door at any time, because the volume of heat is so great that the immediate ingress of cold air is impossible.

I referred to the models as being Dr. Bryant's **Technic Models.** models only because Dr. Bryant manufactures them.

Everyone familiar with the transactions of this institute knows that Dr. Webster originally presented the idea before this body in 1899, and I am not giving Dr. Bryant credit for anything except the manufacture of the teeth and models, and for placing them within our reach.

I am very much pleased with Dr. Webster's new model. I know that he has been working on vegetable ivory for some time and hope he has at last found something which will be an improvement on vulcanite teeth, but I have not yet been able to find anything superior to the teeth supplied by Dr. Bryant.

Dr. Webster also suggested that iron might be used in the technic work for porcelain. Iron is less readily oxidized than nickel, but I believe it is equally impossible to fuse the high grade porcelain "bodies" on iron. Nor do I believe that it would be practicable to apply iron to the construction of crown and bridge work. I have not yet found any metal that can be used with the high grades of porcelain, although low grades can be fused on the surface of nickel or iron because their fusing point is not high enough to oxidize the surface of these metals.

As to when this porcelain course should be given: That will depend largely on the teacher and the school. I do not see how I could place it anywhere else than in the junior year, because we want it to follow the technic courses in operative and prosthetic dentistry. It should be given before the senior year and before students have to apply these principles in the mouth, so that I do not see where else in a three-year course it could be given, except in the junior year.

Dr. Reeves said that he did not see the necessity of teaching the composition of porcelain compounds. I do not believe that we could teach the difference between the high and low fusing bodies without teaching their composition. We know that every compound on the market has a proprietary formula, but we do not need to find that out, and should only aim to impart a general knowledge of the composition of the various porcelain compounds, so that students may know the difference between high and low fusing bodies.

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Second District Dental Society.

February Meeting.

A regular meeting of the Second District Dental Society, of the State of New York, was held on Monday evening, February 8th, 1904, at the Kings County Medical Society library building, No. 1313 Bedford Avenue, Brooklyn, N. Y.

The vice-president, Dr. Hillyer, occupied the chair, in the absence of Dr. Hamlet, the president.

The secretary read the minutes of the November meeting, which were approved; also the minutes of the January meeting, which were also approved.

The paper of the evening was then read by Dr. Woodbridge H. Birchmore, entitled, "An Unexpected Possibility."

Discussion.

Dr. Russell. I really enjoyed that paper very much. I am only sorry Dr. Birchmore did not spread it out over more territory. I do not agree with him that dentists have become very clean animals; on the contrary, I think they are very dirty. I think the majority of dental offices are very unclean. A case of syphilis not long ago was traced to an instrument used by a prominent dentist. The instrument had been used in a mouth where there were mucus patches, and later the dentist extracted a tooth for the young lady, and she was two years in recovering. I saw a case last week, and if the physician had not notified me beforehand, I would not have known of it. This was a woman in good health, a woman of family, of good social position, and she did not know she had it. She may have gotten it from a drinking cup; I have seen a number of cases transmitted in that way.

I am sorry to say the sterilizer is not a common article in dental offices. Another source of infection that has not been spoken of, is found in artificial teeth. We go to the dental depots, select teeth, and if they are not satisfactory, bring them back and change them. We do not know what mouths they go into; we try them, and if they are not right we exchange them. I have spoken to the depots about sterilizing them, and they laugh at the idea. I hope the dentists will get together and force the depots to sterilize teeth. It can be done with very little trouble and very little expense. I hope Dr. Birchmore will go into the matter more fully.

Dr. Ottolengui. I am a very much disappointed man, indeed. I had looked forward to this evening as one that would be of exceeding value to our profession. You heard Dr. Birchmore's story, and I must ask you to hear mine. I never have





fully understood until tonight, why, what was begun as a sort of joint investigation, ceased. I find now from the last interview of which Dr. Birchmore speaks that we must, indeed, have been at cross purposes, because his relation of that interview is absolutely new to me. It is totally at variance with the impressions I meant to convey to him at the time, and the statements he makes in the paper are totally at variance with the impressions he made upon me.

To jump right to that particular meeting, so that you will know what I am talking about, the Doctor states quite definitely what he believes the filth bacillus is, and he locates it on the hands of almost every person, and he was at considerable pains to remove what he states was "feeling" on my part that he should make such an accusation against my toilet. I never had any such feeling. I told him I could not have contaminated those broaches with my hands, because I never had them in my hands. I became convinced long before I consulted Dr. Birchmore that new broaches were just as dangerous as broaches used in a diseased tooth. My method was to sterilize the broaches and a pair of tweezers at the same time, and the broaches were removed with these sterilized tweezers, still wet with the sterilizing fluid and placed in a holder. They were then used absolutely only once in a root canal, and then, sterilized sealed glass tubes which Dr. Birchmore supplied me were opened, the broach dropped in—nut unscrewed—the broach allowed to drop into the tube and the end of the tube put in the flame and resealed. From the time of the sterilization until they were sealed up, they were never in my hands, therefore I was justified in my statement to Dr. Birchmore that there was no contamination from the hands.

Now the point where I say the Doctor gave a different impression to me from what he did tonight, is that he explained quite fully tonight that this filth bacillus can be found commonly on the hands. I got the impression at that meeting that he told me that this particular bacillus was one rarely found except in decayed animal matter or in the rectum.

He is in error when he says I told him the root was cleansed. It was not. That particular tooth, if I might use the expression, was the filthiest tooth in about the filthiest mouth I ever worked on. Now you see how widely at cross purposes we were.

To explain why I am disappointed tonight, it was a part of my plan that Dr. Birchmore should work purely and simply as a bacteriologist; that he should have no knowledge of the dental instruments used. In that way we should get a purely impartial report. But I kept a record of the dental history and I got exceedingly valuable information from the short reports the Doctor gave me; I hoped to receive a full specific report of his cultures, and to have him read a paper before you, giving the bacteriolog-



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ical results of his investigations, when I would follow that with the dental aspect of the investigation—that is, to take the scientific side of it and apply it to our work, and, I can still do so to a limited extent, in spite of the fact that we are at cross purposes.

The first thing that attracted my attention was **Pus Examination.** the fact that I had considerable difficulty with a certain tooth that was abscessed, and I collected some pus on bits of cotton, put them in a tube, and sent them to Dr. Birchmore, asking him to see what he could make of it. He reported to me, I believe, the name of the bacillus that he found—a very persistent one, and that he doubted my ability to cure the disease in that particular tooth. The subsequent history is instructive. With that statement before me, I abandoned conservative treatment, and undertook to amputate the lower terminals of the roots. I had a lower molar which would discharge freely through the roots, but there was no fistulous opening. I attacked the trouble, surgically, made a liberal opening, and burred away the ends of the roots. I know I did, because I saw the tooth afterwards out of the mouth. I succeeded in getting it to heal up; but I was not sufficiently safe in my own mind; I did not feel sure that it would remain healed, and did not insert a permanent filling in the tooth. It remained comfortable for three or four months, and the patient returned in the fall with the condition about as bad as before. About that time, I met Dr. Birchmore again and told him he was right, and that I had not succeeded in that case.

I went through the performance a second time, and subsequently, three or four months after that, the man had trouble with the tooth out West, and very sensibly had the tooth extracted, and he wears a nice little bridge there, which does not bother him at all.

It is a very common practice for surgeons to remove portions of tissue from diseased parts, and send them to a bacteriologist for report, so they might know, instead of guessing, what they are working on. In that particular case Dr. Birchmore's report to me influenced my future procedure, and his prognosis was correct. The thing was incurable. Perhaps he will tell us what the bacillus was.

Dr. Birchmore. I thought it was from an old gumboil. It was the Becker's coccus.

Dr. Ottolengui. That was what originated my idea of working jointly with him. Then we undertook the examination of instruments. I have taken very little stock in the bugaboo that there is a danger between the patient and the dentist; but I believed there was a large danger of that particular kind of infection—putting needles in teeth, then taking them out and putting them in other teeth.





**Report of First Case
Examined.**

The first set of broaches I sent to Dr. Birchmore brought the most satisfactory results. I sent him three broaches, and that was all he knew about it. He obtained cultures from two of them, but he obtained no culture from the third; that astonished him, and that delighted me. The tooth under treatment was a lower molar, very similar to the other, with pus coming through the root canals—a dead putrescent pulp present. I removed one of these pulps with a sterilized broach, and then dropped it into a tube, sealed it up, using the sterilized forceps to hold it. I used boiling water and soda to sterilize. I then took another broach, and used that to remove the pulp from the other canal. That was dropped into the other tube. It was from those two that Dr. Birchmore obtained cultures. The third broach, I used for further cleansing of the two canals, and used it throughout the entire operation; but every time I used it, I dipped it in Schrier's paste (sodium and potassium), and used it for carrying the Schrier's paste down and sterilizing the canals. The valuable point of Dr. Birchmore's report on that point is seen in the fact that he obtained no culture from that particular broach, used in the same two canals as the first and second broaches from which he did get cultures, thus proving conclusively that the Schrier method in sterilizing the canals also sterilized the instruments.

That has been exceedingly valuable to me in practice ever since. That paste consists of sodium and potassium, as you know. I never enter a doubtful canal of any kind even with an instrument that I feel sure is sterile, without first dipping it in the Schrier compound. We saw from our investigations that it was a sterilizing agent for the instrument as well as for the tooth.

The other broaches I sent him were also from infected canals, and he obtained cultures; but it was only when he found this filth bacillus that he was particularly interested, and wanted to be certain that it came from the tooth. It must have come from the tooth, and since then he tells us that he has learned that it is the cause of the fetor of certain mouths.

The point that Dr. Ottolengui has brought out in regard to the carrying of infection, or the sterilization of instruments and keeping them sterile while opening canals, is one that is of great interest to me. I follow a method contrary to that advised by the majority of men, and if it is wrong, I would like to be told of it. Instead of applying the rubber dam to a tooth containing a putrescent pulp, I carefully avoid keeping the tooth dry until it is thoroughly cleansed. First we open the cavity and remove a great deal of decayed dentine and foreign septic matter of all kinds, and if it is removed with the chip blower, we contaminate the air with all kinds of



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septic matter and it is distributed throughout the whole room. I prefer to open the cavity and syringe out with an antiseptic fluid, allowing it to be expectorated into the spittoon and go down the sewer, keeping everything wet. My broaches are all sterilized most carefully, and in addition to that, the point I think of mostly is the sterilization during the operation by the use of sterilizing materials in the root canals. I think it can be done much more thoroughly wet than dry, and we can remove foreign matter more thoroughly if the canal is kept wet with an antiseptic fluid. The instrument working through the antiseptic, if it does carry anything through the foramen, there is less likelihood of infection. I think it is a great point of safety. After you have enlarged your canal, you can apply the rubber dam, and dry out with hot air and absolute alcohol, or whatever you want.

Dr. Ottolengui.

Why does Dr. Hutchinson think if you put the rubber dam on, you must clean out the cavity dry?

Dr. Hutchinson.

I have understood that to be the practice, especially if the Gates-Glidden drill is used, it is used dry.

Dr. Ottolengui.

The proper way, I think, is to have the tooth isolated with the rubber dam. All canal work is done wet by me, but I keep on the rubber dam to keep it

isolated. It is a common thing to have one or two napkins saturated. The rubber dam keeps the cheeks away, and you are not mixing your antiseptics with oral fluids that are full of bacteria. I use the glass syringe that has a plunger made of asbestos which can be sterilized by heating. The rubber dam does not necessarily compel you to keep it dry.

Dr. Hutchinson.

I do not mean to allow the saliva to work into the tooth.

Dr. Ottolengui.

How do you keep it clear?

Dr. Hutchinson.

I use a napkin.

Dr. Russell. How can you take an old, decayed tooth, saturated with pus, and make it sterile in half a day or half an hour? A culture taken from that tooth, after being soaked for five or six hours, will still show bacilli.

Dr. Ottolengui.

I did not say I made it sterile; but I do my best to sterilize it. If the disease is controlled, I consider the treatment successful.

Dr. Ferris. My method appears to be different from what the gentleman has mentioned. When I open into a putrescent tooth, I fear to go into that tooth with any instrument, without first making the tooth, cavity and the instruments as sterile as I can with medication, without attempting any mechanical work other than to enter the pulp chamber. I apply the rubber dam and dry





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out the cavity. The point Dr. Hutchinson brings up, I think, is a very good one, although I never considered it; but the pulp chamber is then covered with a solution of 40 per cent formalin on a small bit of cotton. I seal the cavity with the best cement I can get, and as hermetically as possible, and leave it for twenty-four hours. You must use your judgment in regard to the pericementitis that might possibly exist, but in the majority of cases, even though the tooth is sore to the touch, such a treatment will take care of it in that time. The removal of that dressing in 80 per cent of my cases will give a pulp chamber free from odor, and I feel almost sure there is freedom from bacilli. I may be wrong, but that is my procedure.

Dr. Birchmore. There seems to be very little to say in closing the discussion. The case that Dr. Ottolengui spoke of I have listed here as "Becker's coccus from an old gumboil discharging from a tooth." I thought at the time that I was right, but it seems I got the history wrong. I have tried pretty hard during the last twenty-five years to get hold of a tooth that was reasonably sterile and at the same time was reasonably decayed. Dr. Alvin Thompson and I made the trial systematically once, and we found we could not do it. We found that even seven millimeters from the surface of a cavity, in a large molar, going into a part of the tooth that seemed to be perfectly healthy, I got cultures of the same kind that was on the surface. At the time the studies were made, our class lists were not as accurate as now, and to make any statement as to species and genus would be silly. But the substance that was growing on the cavity had permeated into the tooth a number of millimeters. The tooth is not a very solid structure and I do not see why it should not be possible for the cocci to crawl around anywhere. People are inclined to forget that the life history of any one of these cocci is the same as the life history of larger objects of the same sort. An ordinary white blood corpuscle is about one hundred and eighty times as wide and about sixty times as thick as the biggest of these, so you can see what size hole they can get through.

Dr. Ottolengui. Will you speak of the sterilizing fluids for instruments.

Dr. Birchmore. I can only quote other authorities. At the present moment the fashionable thing to do is to use 40 per cent formalin for everything. The very best thing you can possibly do, however, is to take a certain amount of water—not very much—make a one-tenth of 1 per cent solution of caustic soda, drop the instruments in it, make it boiling hot, take it to the tooth and no infection may be feared from that source.



Root Infection.

The pathological lesion which the dentist is most commonly called upon to treat involves the apex of the tooth root. Here we find various painful and more or less resistant troubles ranging from a simple inflammation of the pericementum, through the gamut of inflammatory and infectious degeneration as far as the true abscess, which if neglected may be followed by necrosis, septicemia and even death. With such a possible consequence, from a cause seemingly so slight, it is a stigma upon the dental profession that the pathology of the apical region is not better understood.

In this issue will be found a paper by Dr. Birchmore, which if carefully read in conjunction with the discussion which followed, will show that there is a fruitful field of work open to those with the skill, knowledge and equipment to throw light where light is much needed.

The editor of ITEMS OF INTEREST, who conceived and inaugurated this joint investigation, between bacteriologist and dentist, is much disappointed at the meagre results obtained. Enough was discovered, however, to show that this sort of research should now be vigorously prose-





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cuted, and it would be of inestimable value if the bacteriologists and pathologists of the various dental colleges should carry through a series of experiments and report upon their results a year hence.

The experiments made with the assistance of Dr. Birchmore, insufficient though they were, brought out a few points of tremendous import, and perhaps only feebly indicate the possibilities which await those who would conduct more elaborate investigations.

Dr. Birchmore reports that he obtained cultures as easily from new broaches, as from those used in tooth roots. Indeed he seems inclined to think the new broach as dangerous as the old. How many dentists have suspected this? How many sterilize a broach fresh from its package? How many broaches are really sterilized at all? Have we as yet a method of sterilizing these finely barbed instruments which absolutely inhibits bacterial growth? These questions are all pertinent and serious.

One reply was found. Two sterilized broaches, used in pus canals of the same tooth, readily yielded pathogenic cultures under the hands of Dr. Birchmore. A third, used several times, in identically the same canals, which were reeking with pus, could not be made to cause infection. Why? Because each time the broach was dipped in the Schrier preparation of sodium and potassium, showing that this one of all the germicides used by dentists, is the only one proven to be positively and immediately effective. Dr. Birchmore's experiment, if substantiated by similar experiments in the future, shows that the sodium-potassium mixture not only sterilizes the canal, but at the same time sterilizes the instrument in use. Can a more valuable mode of treatment for roots be imagined?

We are approaching the opening of an international dental congress. What new, important, and permanently useful method will this congress give to the profession? Time must answer. But looking back to the congress held in Chicago we see that the most important method brought out at that time, was Dr. Schrier's recommended use of sodium and potassium (*kalium et natrium.*) By this means we are afforded not alone a thorough sterilization of the canal, and as we now find of the instrument, thus safeguarding the patient against what the broach might otherwise carry, but in addition the chemical action of the combination assists in the removal of the canal contents, by reducing the same to what is in effect soft soap, which may be readily washed out. These are facts well



known to those who have continuously used the agents since their introduction. Yet the profession at large has entirely failed to appreciate the method. The first agents for the sodium-potassium preparation were the S. S. White Co. But within a comparatively brief time, they ceased importation because the materials would be lost by oxidation, so slow was the sale. Messrs. Ash & Sons likewise brought over a lot, a good share of which, we are told, remained on their hands as a loss, and thus ate up the possible profits. A few dentists in New York persuaded the Consolidated Dental Manufacturing Co. to take the agency, but their experience has been the same, the dentists not buying enough to make importation profitable. We can scarcely blame the dental dealers for declining to purchase what they cannot afterwards sell. If dentists do not want this, the very best agent for root sterilization, simply because it happens to be a little difficult to handle, and to keep free from oxidation, or else because it is a little more costly than others which are cheaper and at the same time less efficient, the disgrace and the blame is theirs and cannot be laid to the door of the dealers.

Another very important point brought out by Dr. Birchmore is that root infection does not indicate the presence of any one particular germ, several totally different kinds having been found in only a few experiments. Many will say, "Why of course; that was to be expected."

Perhaps, yet if readily conceived as soon as one "stops to think," apparently no one has heretofore stopped to think. The treatment of abscess has been entirely empirical so far as the specific germ is concerned. The surgeon, dealing with a suspicious growth, or abscess, has a piece of the tumor, or a drop of the pus, examined by the bacteriologist, as an initial procedure. From this report he knows what disease is present. Confronted with alveolar abscess, the dentist injects through the root, or through the fistula, one set of drugs, regardless of what may be the true nature of the lesion. One in a hundred, perhaps, runs a bur over the end of the root; one in a thousand may occasionally essay root amputation.

Perhaps if in the future we should obtain a bacteriological report upon the pus at the outset, we would begin to be dental surgeons in something more than name only. We would use the knife and bur more often and escharotic drugs less frequently; and perhaps our success would be proportionately more frequent.

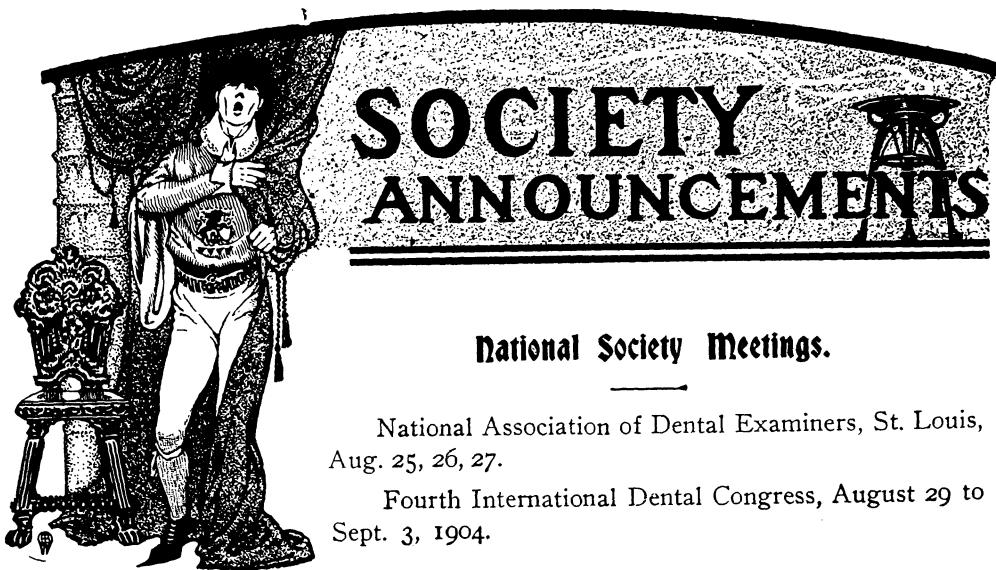




Correction of Error in Dr. Case's Paper in July Number.

We regret exceedingly an unfortunate error that crept into the publication of Dr. Case's paper in the July number. On pages 494-5 are illustrations of two totally different cases as is seen by the models; whereas the cuts showing the faces are really illustrations from the same case. Dr. Case furnished us with two negatives intending that the best should be used. Unfortunately, in transit, the negatives received belonging to Fig. 7 were broken, and we have erroneously used the wrong illustration in its place. In justice to Dr. Case, who is in no way to blame, this explanation is made. A new illustration will be obtained and published with the transactions of the Pedagogic Society, and all who are interested in having this article in its correct form may obtain a copy of the transactions by writing to Dr. Case.





National Society Meetings.

National Association of Dental Examiners, St. Louis,
Aug. 25, 26, 27.

Fourth International Dental Congress, August 29 to
Sept. 3, 1904.

State Society Meetings.

Delaware State Dental Society, Oct. 5.

Illinois State Dental Society, Moline, May 9-10-11, 1905.

Montana State Dental Society, Butte, Feb. 20-21, 1905.

Virginia State Dental Association, Old Point Comfort, Aug. 2-3-4.

Fourth International Dental Congress.

St. Louis, Mo. August 29 to September 3, 1904.

Official Train.

Official through train consisting of sleepers, dining car, observation car and buffet, library, smoking car, will leave New York City via New York Central Railway, Saturday, August 27, at 10 a. m., passing Albany 1:15 p. m., connecting with trains from Boston and New England; passing Syracuse 6 p. m., Rochester, 7:42 p. m., arriving Buffalo 9 p. m., leaving Buffalo (via Lake Shore Railway) 9:20 p. m., passing Cleveland 12:20, night, thence via Big Four Railroad arriving in St. Louis about noon Sunday, August 28th.





Round trip ticket, 15 day limit, from New York, returning from St. Louis either direct or via Chicago and Alton Railway to Chicago, and Lake Shore Railway, with stop over at Chicago and Niagara Falls, \$26.25. Sixty-day limit \$32.25. These rates are exclusive of sleeping car.

Members living in vicinity of New York, will join official train at New York City, and those from Philadelphia and vicinity at Buffalo. Same rates and accommodations can be secured via the Lehigh Valley Railway to Buffalo thence to St. Louis from Philadelphia and vicinity as via any other direct line.

For information regarding reservation of berths, tickets, etc., from New York, Philadelphia, New Jersey and New England, apply at once to Dr. W. C. Deane, 114 East 60th street, New York City. From Western New York and Canada, to Dr. F. E. Howard, 331 Franklin Street, Buffalo, N. Y.

For the accommodation of those in the party, hotel reservations in St. Louis should be made at the Jefferson Hotel, headquarters of the Congress, not later than August 1, either direct or through Dr. D. O. M. LeCron, Missouri Trust Building, St. Louis, Mo.

Fraternally,

W. C. DEANE,

114 East 60th Street, New York City.

The Interstate Dental Fraternity.

The Interstate Dental Fraternity will hold its annual meeting at St. Louis, on Tuesday, August 30th. The business meeting will be at 3 p. m., to be followed by a banquet.

The committee in charge are Dr. Burton Lee Thorpe, chairman, Dr. Edward Everett Haverstick and Dr. Ernest P. Dameron. Members may procure their banquet tickets in advance by remitting to Dr. E. E. Haverstick, 346 N. Boyle Avenue, St. Louis.

R. M. SANGER, National Secretary.

Fourth International Dental Congress Banquet.

The Fourth International Dental Congress banquet will be held on the first of September at 8 p. m. in the Coliseum adjoining the Congress Hall. The price per plate is \$3. It is requested that all who expect to attend send their names and money to Dr. A. H. Fuller, P. O. Box, 604, St. Louis, Mo., at once, and not later than August 20th. Arrangements



SOCIETY ANNOUNCEMENTS

to pay can be made with Dr. A. H. Fuller at the time of registration, provided notice is given before August 20th.

G. A. BOWMAN,
A. H. FULLER,
ADAM FLICKINGER, Banquet Committee.

Fourth International Dental Congress.

Section VI. Orthodontia.

PROGRAMME.

EDWARD H. ANGLE, St. Louis, Chairman.
MILTON T. WATSON, Secretary, Detroit.

Irish Types of Malocclusion.....	W. Booth Pearsall, Dublin
Nasal Obstructions and Mouth-Breathing, with Special Reference to Malocclusion of the Teeth.....	J. Sim Wallace, London
A Contribution to the Treatment of Short Bite and Jump Bite Cases.....	Wm. Slocum Davenport, Paris
Nature as a Regulator and Our Duty as her Assistants.	L. C. Bryan, Basle
A Proposal for an International Nomenclature for the Various Forms of Malocclusion.....	John E. Grevers, Amsterdam, Holland
The Study of the Etiology of Anomalies of Human Teeth,.....	Jose J. Rojo, Mexico City
Essay.....	M. Chiwaki, Tokyo, Japan
The Correction of Deformities in Fractures of the Nose.....	Francisque Martin, Lyons, France
Prognathous Forms and their Orthopedic Treatment.....	Dr. Schroeder, Greifswald, Germany
Essay.....	Franz Zeliska, Vienna
Essay.....	Hopewell Smith, London
Malocclusion; Class II. and Its Divisions..	Edward H. Angle, St. Louis
Mesial Position of the First Molars in Class I.....	Robert Dunn, San Francisco
Principles and Methods of Retention in Orthodontia.....	Calvin S. Case, Chicago
Spreading the Maxille versus Spreading the Arch.....	R. Ottolengui, New York City
Art.....	Edmund Wuerpel, St. Louis
Essay.....	Herbert A. Pullen, Buffalo
Essay.....	S. Merrill Weeks, Philadelphia
Essay.....	G. V. I. Brown, Milwaukee
A Method of Determining the Normal Arch and Its Application in Orthodontia.....	Charles A. Hawley, Columbus





Southwestern Iowa Dental Society.

The next meeting of the Southwestern Iowa Dental Society will be held at Osceola, on October 11th and 12th.

Creston, Ia.

J. A. WEST, Sec'y.

Delaware State Dental Society.

The next regular meeting of the Delaware State Dental Society will be held on Wednesday, October 5, 1904.

Wilmington, Del.

R. H. JONES, Sec'y.

Virginia State Dental Association.

The thirty-fifth annual meeting of the Virginia State Dental Association will be held in the Champlain Hotel, Old Point Comfort, Va., on August 2-3-4.

Reduced rates for members and their guests. A cordial invitation is extended to our brethren of other States.

Richmond, Va.

J. HALL MOORE, Cor. Sec'y.

The Waterville Dental Society.

The Waterville Dental Society was founded in May, 1903, for the purpose of mutual benefit and advancement of its members in their profession. It had its first meeting for organization at the Elmwood, and since that time has met on the first Friday of each month.

Each meeting a paper has been read and discussions held, which have proved very beneficial. Several excursions and banquets have been on the programme where the ladies participated and a general good time was the result. In May, 1904, the society celebrated its first annual by going, accompanied by the wives and best girls, to East Vassalboro, to one of Mine Host Bradley's famous chicken dinners, which was enjoyed after an 18-mile sail around the beautiful China Lake on Captain Butterfield's steam launch—and voted a perfect day and perfect time.

The officers are: President, Dr. E. H. Kidder; vice-president, Dr. M. D. Johnson; secretary, Dr. Guy Smith; directors, Dr. E. L. Jones, Dr. H. E. Toward, Dr. H. W. Mitchell.